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# CONTENTS.

LECTURE I.

PAGE

Froebel's place amongst the world's educators. A short account of his life. His experience as a Schoolmaster. His work for Infant education ... ... ... ... 1

LECTURE II.

The significance of play. Activity, the essential expression of all life. How this activity expresses itself. The value of organized play. Classification of games. Some guiding thoughts in the selection and the playing of games ... ... ... 10

LECTURE III.

Nature-teaching in its broadest sense, the basis for all education and instruction. The place of gardening in any general scheme of education. Experience proves that nature-teaching or gardening should be the centre point of all the other (secular) work of any school for children up to, at least, nine years of age. The valuable means it offers for the teaching of most of the sciences to scholars of more advanced age ... ... ... 14

LECTURE IV.

The effect of gardening upon the child, the school and society at large. The responsibility of educational authorities with regard to the question ... ... ... ... 17

LECTURE V.

Example of the treatment of natural objects according to Froebelian principles ... ... ... ... ... 21

LECTURE VI.

The relation of hand-work to nature-work ... ... ... 29

LECTURE VII.

On the use of stories as an educational means. Classification of stories. Suggestions for the guidance of teachers in the telling of stories ... ... ... ... ... 33

## LECTURE VIII.

PAGE

Poems and songs. Thoughts which should guide teachers in the selection of poems and songs ... ... ... 38

## LECTURE IX.

On the teaching of colour, form and number. The advantages of Kindergarten methods for this kind of instruction ... ... 41

## LECTURE X.

Language work. Conversational lessons, their nature and proper place in a time-table and in the teacher's thoughts. Reading and writing, their place in the curriculum of a school ... 46

## LECTURE XI.

Occupations suitable for the youngest children. For the older children of infant, primary and other classes. Froebel often misrepresented in this matter ... ... ... 50

## LECTURE XII.

Manipulation of the following materials with notes on the same. Gifts 1, 2, 3, 4, 5, 6. Bead and other threading, fraying, sand-work, stick and ring laying, paper-folding, drawing, modelling and brush-work ... ... ... ... 53

## LECTURE XIII.

Time-tables. Summary and list of books recommended for teacher's study and reference ... ... ... ... 80

Schemes of nature-study—
1. The French bean ... ... ... ... 84
2. The silk-worm ... ... ... ... 89
3. The sun ... ... ... ... 94
4. The sun-flower ... ... ... ... 101
5. The pigeons ... ... ... ... 101
6. The grass family ... ... ... ... 114
7. The cotton family ... ... ... ... 125

# ILLUSTRATIONS.

PAGE

Fig. 1. Gift I ... ... ... ... ... 54

Fig. 2. Gift II ... ... ... ... ... 55

Fig. 3. Specimen constructions with Gift III ... ... 57

Fig. 4. Specimen constructions with Gift III ... ... 58

Fig. 5. Specimen constructions with Gift IV ... ... 59

Fig. 6. Specimen constructions with Gift IV ... ... 59

Fig. 7. Specimen constructions with Gift V ... ... 60

Fig. 8. Specimen constructions with Gift V ... ... 60

Fig. 9. Specimen constructions with Gift VI ... ... 61

Fig. 10. Specimen constructions with Gift VI ... ... 62

Fig. 11. Specimen constructions with Gift VI ... ... 62

Fig. 12. Bead-threading ... ... ... ... 63

Fig. 13. Fraying ... ... ... ... 65

Fig. 14. Sand-work ... ... ... ... 66

Fig. 15. Stick and ring laying ... ... ... ... 67

Fig. 16. Paper-folding ... ... ... ... 68

Fig. 17. Paper-folding ... ... ... ... 69

Fig. 18. Paper-folding ... ... ... ... 69

Fig. 19. Paper-folding ... ... ... ... 70

Fig. 20. Paper-folding ... ... ... ... 70

Fig. 21. Mass drawing ... ... ... ... 74

Fig. 22. Line-drawing with chalk ... ... ... 74

Fig. 23. Drawing with both hands ... ... ... 75

Fig. 24. Beginning of brush-work ... ... ... 76

Fig. 25. Drawing an object in pencil and brush ... ... 76

Fig. 26. Clay-models ... ... ... ... 77

Fig. 27. Clay-models ... ... ... ... 78

Fig. 28. Drawings made by children in connection with the study of the French bean ... ... ... ... 86

Fig. 29. Drawings in connection with the study of the silk-worm ... 91

Fig. 30. Drawings in connection with the study of the sun ... 98

Fig. 31. Drawings in connection with the study of the sun-flower ... 103

Fig. 32. Drawings in connection with the study of the pigeons ... 110

# INTRODUCTION.

MISS LATTER began to deliver Kindergarten lectures in Bangalore on Wednesday the 2nd of October 1907. In her introductory speech, she said, that when the Inspector-General of Education requested her to visit the Mysore State and introduce the system of Kindergarten Instruction in the schools of the State, she felt, considering the magnitude of the task before her, very diffident about the result of the work she was about to undertake. Nevertheless, as an educational enthusiast, she was very glad to respond to the call—to come and interpret more fully to those interested in Infant Education in Mysore, the message of one of the greatest educators the world has ever seen. She said that teachers should always be learners and should go on learning all through their lives. She had been a teacher for twenty-five years and all through this period she was also a learner and was still learning. She came to India to give the best thoughts of her country to this land and to carry the best thoughts of this land to her home.

As she was of opinion that theory and practice should go hand in hand, she would devote a portion of her time to explain the principles of the Kindergarten and the remaining portion, to demonstrate how such principles might be put into practice. She thanked Mr. M. Kantaraj Urs for the kindness he showed in readily giving the use of the building for the Kindergarten work in Bangalore. With these preliminary remarks she began her first lecture.

When Mr. H. J. Bhabha, M.A., the Retired Inspector-General of Education, asked me to prepare my notes of Miss Latter's lectures for the press, I found the task was rather difficult for Miss Latter owing to the shortness of the period at her disposal in Bangalore, did not deliver some of her lectures as fully as she would have done, if she had had sufficient time at her disposal. These notes to be useful to the general body of teachers required to be supplemented by additional information. Hence extraneous information taken from varoius sources has been introduced into some of the lectures. Important publications bearing on Infant Education have also been consulted in the preparation of these notes for the press. As desired by the Retired Inspector-General some Schemes of Nature Study that have been worked out in the Primary classes of the Practising School attached to the Government Normal School at Mysore, have also been inserted. Of these schemes, two have been based on schemes of work prepared by Miss Latter, one on a scheme prepared by Miss A. Williams and the rest have been prepared by me for the use of the Practising School. Since sending these notes to the press, a few other schemes have been worked out in the Practising School, but I think the schemes given here are enough to indicate the place of nature-teaching in the Infant School curriculum and the mode of correlating the various occupations and lessons of the Infant School one with another. I must thank Mr. M. Hiriyanna, M.A., L.T., Headmaster, Normal School, Mysore, for the help he gave me while the volume was in the press.

GOVT. NORMAL SCHOOL,
MYSORE,
*12th December 1910.*

M. VENKATASUBBAIYA,
*Assistant Master,*
*Govt. Normal School, Mysore.*

# LECTURE I.

FROEBEL'S PLACE AMONGST THE WORLD'S EDUCATORS.—A SHORT ACCOUNT OF HIS LIFE.—HIS EXPERIENCE AS A SCHOOLMASTER.—HIS WORK FOR INFANT EDUCATION.

MANY people think of Froebel as one who merely provided a variety of occupations and amusements for little children or as the propounder of certain admirable but not indispensable methods for making instruction easy and for developing children's senses, limbs and faculties. In truth, however, he did much more than this as we shall see when we follow the story of his life; we may, however, note that by his Kindergarten he made most important contributions to the science and art of education. Realizing most vividly what the highest human development ought to be, he placed early education on a scientific basis. He made additions to the practical methods employed for children's training and in his Kindergarten—which owes to him its origin—he showed how these methods were to be applied, and he founded the first training school where mothers and educators imbued with a motherly spirit could be systematically prepared, not only through book-learning, but by scientific teaching, by life and by contact with children, for their important mission. We should not think that his ideas were isolated and independent—without relation to earlier educational discoveries. No great truth in education is the outcome of the thought of a single individual, although at a given time such truth may take form in the world through an individual. Such truths have been evolved by the earnest efforts of the great educators of the world who have devoted their whole lives to the cause of education. Each individual adds something to the truth he is passing on. The illustrious predecessors of Froebel such as Comenius and Pestalozzi had similar ideas about education, and Froebel in his Kindergarten organized them into practical form. It was he who, by means of his Kindergarten, established a connection between the home and the elementary school. In basing his system on spontaneous activity, he not only goes with the trend of the child's mind, and gets the benefit of his energy and will, but brings about a free and healthy physical, moral, and intellectual growth.

"Pestalozzi's great contribution to the science of education was 'Anshung' or observation, thought and deed in their right order. Froebel's great and final contribution to pedagogy was the doctrine of 'Darstellung' or a varied expression of the inner self by spontaneous activity."

As we cannot get a clear conception of the philosophy of Froebel's system without knowing something about the man himself, it is necessary that we should study the main incidents of his life and it is here we find the key-note to his system.

Froebel's life naturally divides itself into four main periods :—

(i) The first fifteen years, during ten of which we have presented to us a thoughtful sensitive child suffering a good deal from mismanagement and want of management.

(ii) The second period covers ten or fifteen years. It is the time of preparation. He spends the whole of his time in striving to find his natural vocation.

(iii) The third period is the time spent by Froebel in the full evolution of the Kindergarten idea.

(iv) The training of women is the crown of Froebel's work and entirely absorbs the last fifteen years of his life. Froebel studies the mother's instinctive methods as carefully as he studied childhood. He wishes the mother to consciously pursue her methods for the training of the child.

### First Period.

Friedrich William August Froebel was born in the village of Obserweisback—a village in Thuringian Forest, in the heart of Germany—on the 21st of April 1782, when Pestalozzi was just 36 years old. His father, a clergyman, was always busy looking after his parishioners and his church. It is unfortunate that Froebel, when he was only nine months old and when his mind was just becoming conscious of the external world, should have lost one who was very precious to him, *i.e.*, his mother. In his fourth year, his father married again but this did not mend matters. His step-mother after a while treated him very coldly, always repressed him and spoke to him in the third person (which is regarded as highly contemptuous in Germany). But all through these hardships and difficulties he retained his childlike faith and trust in his elders. The vicarage had a small garden enclosed on all sides, and Froebel was allowed to play only in this little garden. His father was fond of gardening and often allowed Froebel to help him. Froebel's parents loved order and created a love for it in their children also. Froebel had four brothers, two of whom had great influence upon him; he had otherwise no companions proper to his age. Hence his life during this period was dull and dreary. Froebel's father wished to keep him with himself for education, but as he was slow in learning to read, he sent him out to a girls' school. Here he developed a shy and awkward manner. He was often in his father's study, and heard him settle disputes of persons who came to him for such settlement, and he soon began to think that the world was full of sorrow and trouble. He had his trials till he was ten years old. At this time an uncle paid a visit to the vicarage and during the visit he saw the unhappiness of the child and took him to his place. Till fifteen Froebel was with his uncle at Stadt Ilm, who put him to a boys' school. Here Froebel was very shy and was unable to play any of their games for a time. The subject which most appealed to him in his school work was arithmetic. His uncle was kind and sympathetic towards him and in this place he was allowed to wander where he pleased. After fifteen he returned to his father. He longed to study forestry, and his father, consenting to this step, apprenticed him to a forest-surveyor. His father told him that he should not complain about anything, but that he should learn land-survey and mathematics. Though the forester did not teach him anything, Froebel made good use of the library that the surveyor had. After two years, he came back but he did not receive a hearty reception at home. The surveyor had written to Froebel's father that the boy had not worked satisfactorily. He wished to go to university to continue his studies but expense was a great hindrance in the matter. Ultimately he was sent there on his own money which his mother had left him. He joined the University of Jena in 1799. While there, his brother got into difficulties, and while trying to relieve him, Froebel got into debt and had to go to the university prison. Froebel left the university about the middle of 1801 and went to a relative of his father to study farming for a little while until the money—a very small sum—was paid. In 1802 his father became very ill and Froebel had to come back. He spent a few weeks with his father and it was then that father and son knew each other properly. His father died of his illness and Froebel became his own master.

### SECOND PERIOD.

Froebel had then to think of a way of making his living. He therefore took up architecture and mathematics as applied to that work. In 1805 he was offered work at Frankfurt-on-the-Main. Here he fell in with a number of young men and one of them, Gruner, a disciple of Pestalozzi, was the head of a school. He asked Froebel to give up architecture and take up teaching. Froebel accepted this offer and became an assistant in that school. When he found himself before a class of children, he felt, as he wrote to his brother, like a bird in air or like a fish in water, in his proper element. While working as a teacher, he earnestly wished to see Pestalozzi and during his first holidays went to Yverdon for this purpose. Pestalozzi was then at the height of his prosperity. Many important visitors used to go to his institution every day. During the short time that Froebel was there he saw much. He specially admired the wandering classes, the teaching of geometrical drawing, geography and the out-door lessons about plants. But reading and writing were not connected as he thought they should be. He felt that other subjects such as geography and botany might be similarly connected. After visiting Pestalozzi's institution he went back to his work and was very successful in it. He helped to draw up a plan of work for the school. He threw himself so heartily into this work that his class soon became the model class of the school and at a public examination of the school his work won special commendation. He taught geography by going out of doors and studying the land in the neighbourhood of the school. He tried to teach writing, reading and arithmetic by relating them to one another. This measure of success did not satisfy him and he wished to know more. Besides being a teacher in a public school, he was also private tutor to three boys. These were the sons of Frau Von Holzhau Sen. Her kindness, intelligence, and refinement, her simplicity and dignity of character, won Froebel's admiration and a lasting friendship grew between them. Here too Froebel found he had to study. With his private pupils he again went to Pestalozzi in 1808. He noticed the importance of the walks and nature-study. The use of the play-ground for games, etc., struck him very much. He wrote a pamphlet on Pestalozzi's work for the Princess of Rudolstadt. The singing at that institution made also a strong impression on him. He stayed there for two years and during this time he found that Pestalozzi was losing control over his work. He then went to Gottingen University and there studied languages and physics. He went to Berlin in 1812 and there studied crystallography, mineralogy and geology. In all these studies he was trying to trace one law of development. About this time his country was in danger of invasion by Napoleon I (1813) and he had to fight in defence of his country. It was here that he made two life-long friends in Middendorf and Langethal (1814). After the war the army was disbanded and Froebel went to Berlin, where he was made Curator of the Mineralogical Museum. He was there for two years and all along he wished to know more about education. At this time his brother Christopher died and left three sons behind him. His sister-in-law wrote to him to do what he could with them. With these three nephews and two others who were the children of another brother—Christian, he began his school at Griesheim. He wrote to Middendorf and Langethal to join him in his work (1817). The school was after some time removed to Keilhau. When Miss Latter went there in 1894, she met several people who knew Froebel. She saw some Kindergarten work which was done under Froebel's auspices. She went to a hill near where there were traces of plots used by boys for gardening during Froebel's time. She found that the boys had special battle games on Saturdays after school work. In the evening the boys usually did modelling and cardboard work whilst one of the teachers read to them. Possibly the work of these winter evenings suggested the later occupations of the Kindergarten. Langethal taught history very well, Middendorf had a fancy for poetry and Froebel liked manual labour. In his institution, theoretical work and manual labour were carried on together. In 1818 there was a change in the institution. Froebel married Franlein Wilhelmine Hofmeister, a lady whom he had met in Berlin. Though the boys did not at first appreciate the arrival of ladies to the institution, as it placed a restraint upon their movements, things began to set right after a time. In 1826 Froebel wrote his work called "The Education of Man." In 1823 there was another change in the institution and this was the introduction of a new master Barop. About this time his nephews behaved badly, perhaps at the instigation of their mother. In 1830 Froebel left Keilhau for a time. The most prosperous years of the school were from 1824 to 1826 when the pupils numbered fifty-six.

Though the school had become popular and was doing excellent work, yet signs of an approaching storm were not wanting. The band of workers were no doubt excellent educators; but unfortunately none of them had much practical business capacity and did not, therefore, carefully see and provide for the increasing needs of the school, and financial troubles could not but arise out of such a state of things. The democratic spirit was still rife and the Government looked with an unfriendly eye on Froebel's institution under the mistaken notion that his institution favoured the growth of such a spirit. The enemies of Froebel clamoured for a suspension of the school, but the Duke of Rudolstadt stood firmly by the institution and refused to close it.

Froebel had for a long time been thinking of a scheme of rational education and gave it a practical shape about this time. In this scheme he proposed :—

(i) A nursery-room for children under seven years.
(ii) An elementary school.
(iii) A technical school.
(iv) A school for mothers.

This scheme is valuable for it expresses fully Froebel's educational idea. The Duke of Meiningen hearing of it got interested in it and sent for Froebel. He proposed to Froebel that he would hand over one of his small estates for putting the scheme into practice. When the Duke consulted Froebel with regard to the education of his only son, Froebel urged that he should be educated with other boys. This gave offence to the former directors of the boy's education, and, prompted by jealousy, they did what they could to throw the scheme into discredit. The Duke began to waver and tried to impose limitations on the number of pupils, etc., and Froebel seeing that he could not carry out his scheme in its entirety decided to give up the plan altogether.

In 1831, Froebel went to Frankfurt to see his many friends. Here he met an accomplished musician by name Schnyder, who carefully examined the scheme drawn up by Froebel and was impressed with its value. He invited Froebel to Switzerland and said that he would place the castle of Wartensee at his disposal. With the sanction of the Minister of Education of the Canton of Lucerne, a school for boys was started in that castle. Froebel worked most energetically at the new school, and in spite of anonymous articles in the newspapers against it, continued to show good progress.

When at Wartensee, Froebel, Middendorf and Barop were one day discussing about the school and its work, while taking refreshments at a restaurant, and at this time, some merchants of Willisaw who came in, listened to it for some time and then joined in it. They went to their place and sent an invitation to Froebel to open a similar school at Willisaw. A school was opened there with 36 pupils (1832), but the clerical element was against it and Froebel had a hard time of it. While working at Willisaw, the Government of Berne asked Froebel to take charge of an orphanage at Burgdorf, and he became the director of the institution in 1835. The place was lovely but the work was very heavy. There was a day school, a boarding school, and a training school for teachers. The little band from Keilhau had to manage all these and were obliged to make heavy sacrifices.

## THIRD PERIOD.

About this time Froebel visited a number of infant schools in Berlin. These visits and the ideas that he had in his mind about infant training for a long time made him give up boys' schools and take up the work of infant training. He saw that children came to boys' schools either untrained or badly trained. Hence he wished to get at the root of the problem of education by taking up the training of these little children. From 1836 to 1839 he was constantly travelling—often on foot—and was closely studying the instincts and activities of children wherever he went. Though he had three prosperous boys' schools under him, he gave up everything for the sake of the little ones. In 1839 a terrible blow fell on Froebel by the death of his wife who loved him dearly and who had put her heart and soul into his work.

Even this terrible blow did not stop him in his work. He went to Blankenberg (1839) and there started his first "Kindergarten." He wished to find a name for his youngest child and while walking over a hill with two friends he hit upon the name "Kindergarten." By this name Froebel meant that children should be tended like little plants. The Keilhau friends all thought it would be fitting to introduce the new name to the public by a festival. Hence on June 28, 1840, they got up a festival to mark four events :—

(i) The birthday of the boys of his school.
(ii) The 400th anniversary of Gutenberg's invention of printing.
(iii) The christening of his new school.
(iv) The midsummer holiday.

The festival began at Keilhau and was continued in the afternoon at Blankenberg.

## FOURTH PERIOD.

Soon after he established his first Kindergarten, Froebel felt the necessity of training women for the work and thought about it. In 1843 he published a book called "Mutter—und—Kose-Leider" for the guidance of the mothers. He established a training class for women at Keilhau. In 1847 this class was attended by Alwina Middendorf, Frau Frankenberg, Louis Levin, Emma Habich, Fraulin Sticler, Augusta Traberth and Henrietta Breymaun. The most distinguished of all these pupils was his grand-niece, Henrietta Breymaun (afterwards Frau Schrader). Froebel also delivered a course of lectures to the women students in Hamburg. His aim was to rouse to the utmost and win over to the service of early education the whole strength of womanhood. Women are destined to develop the first germs in the child's mind in all their simplicity and purity before they are exposed to any perverting influence in the world. It is the mother who exerts upon humanity the strongest influence for good or evil. Thus women render a more important service to society than men. Fit or not, she must of necessity be the first educator of the child. It is she who strikes the key-note for his future and gives the bent to his life. Train the mother and you train the child. If all mothers are to share in the education of the young generation, there must be national Kindergartens which may serve as training institutions for all mothers.

All these years Froebel was constantly travelling and explaining his principles. By the end of the year 1849 a good deal had been done to elaborate the gifts and occupations. While Froebel was at Marienthal in 1849, a great friendship arose between him and Diesterwig, a celebrated Pestalozzian teacher, through the agency of Frau Von Marenholtz. Froebel had been described to him as an old fool who played with little children. In 1851, Froebel married, a second time, a lady by name Louis Levin (one of his pupils) who comforted him in his declining years and carried on his work after him.

In the same year, a sad misfortune came upon him suddenly. An order was received from the Prussian Government that all Kindergarten schools in Prussia should be closed. The cause of this order was that Karl Froebel, one of his nephews, published some socialistic doctrines, and though Froebel said that he had nothing to do with them, the Government did not listen to him and closed his institutions. This brought a gloom upon him. But his influence did not cease, as shown by a conference held at Liebenstien towards the end of September. At this conference, many of the foremost educationists of the day were present. At the conclusion, the following resolution was put to the vote and carried :—

"That Froebel's contribution to pedagogy is of the utmost importance for the understanding of childhood. His principles are adapted to help mothers and to benefit family life. Hence the Kindergarten movement is worthy of our utmost support, and those who work for it deserve the gratitude of the nation."

In May next year, he attended a Teachers' Congress held at Gotha. When he went into the Conference Hall, the whole assembly rose to honor him and at the end called out three cheers for him.

In spite of these honors, the blow brought on illness, which increased day by day, and he passed away peacefully on the 21st

June 1852. To the last he loved his little Kindergarten children and was in return deeply loved by them. Thus ends the story of a great man; but the spirit of the man still lives and will continue to live for ever. Some years after his death a monument was raised over his tomb.

References:—

(i) "The Kindergarten System." By Franks.
(ii) "The Autobiography of Froebel." By Michaelis.

# LECTURE II.

THE SIGNIFICANCE OF PLAY.—ACTIVITY, THE ESSENTIAL EXPRESSION OF ALL LIFE.—HOW THIS ACTIVITY EXPRESSES ITSELF. THE VALUE OF ORGANIZED PLAY.—CLASSIFICATION OF GAMES. —SOME GUIDING THOUGHTS IN THE SELECTION AND THE PLAYING OF GAMES.

'To objectify himself, to take the world into himself and to discover and represent the ideal implicit in each—such are the deep impulses which stir the child to play.' Activity being the expression of all life, plays have for their basis the utilization of this activity. Many plays originate in the desire to exert force or to measure it against the force of others. Other plays again originate in the desire to reproduce in play the life around. The highest form of play is the blending of the two to create an ideal world whereby the child throws into an active poem the total life within and around.

The innate activity of children manifests itself in two forms :—

(i) Spontaneous activity (play).
(ii) Directed activity (work).

## SPONTANEOUS ACTIVITY.

The exercise of the active powers for the sake of the delight they afford without regard to the result, constitutes that form of activity which is called *play*. Play is to the child what light and air are to the bird. It is both his distinctive activity and the element in which his life moves. In play he suffers the constraint neither of an alien will, nor of self-imposed purpose, but exercises his activity which is its own end and its own reward. To study him in his play is therefore to study him when he is most himself. It is in free-play that the child is spontaneously acting out his inner life.

## DIRECTED ACTIVITY.

The exercise of the active powers for some purpose with regard to the result constitutes that form of activity which is called *work*. Amusement is the only end in free-play, whereas organized play is undertaken with a definite end. After sometime, children get tired of mere amusement and want work at intervals. When a child goes to the mother and asks :—" What can I do ?" it is evident that he wants his activity directed to some purpose. He helps the mother until some day helpfulness becomes a habit. Hand-work ceases to be play when purpose comes in. Though work and play have different ends in view, one merges into another and no sharp line of demarcation can be drawn between the two. With younger children the play-spirit predominates. Though organized play is a most prominent part of the Kindergarten, free-play should also form part of our work in all classes. This is the teacher's opportunity for knowing children.

Play develops originality and enriches the individual with something distinctive which he may contribute to his fellows. Work without play degrades a man into a machine, and play without work makes him the toy of circumstance and impulse. Every creature whether young or adult needs recreation or play as well as work.

The following is what Harris says about free-play and work :—" In play the child exercises his caprice, sees possibilities and transforms things according to his arbitrary will. In this he learns his own power and thereby develops his individuality. When he acts under the direction of another, he does not realise what is peculiarly his own causal energy. It is not *his* ideal but the ideal of *another* that he realises."

Ruskin in his " Crown of Wild Olive," thus distinguishes play from work :—"Roughly, not with vain subtlety of definition, but for plain use of words, play is an exertion of the body or the mind made to please ourselves and with no determined end, and work is a thing done because it ought to be done and with a determined end. You play, as you call it, at cricket for instance. That is hard work as anything else, but it amuses you and it has no other result but amusement. If it were done as an ordered form of exercise for health's sake it would become work directly. So, in like manner, whatever we do to please ourselves, and only for the sake of pleasure and not for an ultimate object is play; the pleasing thing, not the useful thing. Play may be useful in a secondary sense (nothing is indeed more useful or necessary), but the use of it depends upon its spontaneousness."

The value of organized play—games, may be thus summed up :—

(i) The child's natural love of bodily activity and imitation (mimic action) are gratified in a legitimate way. The body is developed and strengthened without the semblance of a lesson and the moral level of children's play is raised by means of games.

(ii) The powers of the mind are called into play by the mimic action which is the expression of some idea in the mind relative to the various objects in nature or in life. Games should have some reference to nature-teaching.

(iii) The child who takes part in a well-ordered game puts himself under certain rules which he and others have to follow to ensure the success of the game. He thus realises for the first time that he is one member of a whole, that he forms an integral part of a society which can only accomplish its purpose if all its members unite in its several efforts.

## Classification of Games.

The games that children play can be classified into (i) Round Games, (ii) Finger Plays, (iii) Ball Games, and (iv) Marching Games.

Some guiding thoughts in the selection of games :—

(i) The games that we select should be such that most, if not all, can take part in it.

(ii) The game must be such that most of the muscles of the body are called into play while the children are engaged in it.

(iii) Whenever possible, it should be connected with nature-work.

(iv) The game must also be connected with the healthy and happy experiences of children.

(v) The words and tunes of the songs must be suitable to children and the tune should be such as would attract them. The tune should not be too difficult for them.

(vi) The action required by the game should be bright and varied and should not be too numerous.

(vii) We should not select such games as are injurious mentally or physically.

(viii) The game should call forth and exercise the imagination of children.

How games should be directed :—

(i) The teacher herself should know the tunes, words, and actions of the games.

(ii) She should not keep aloof from children but should take part in their game.

(iii) The subject of the game should be introduced by means of a chat. The actions must be shown and each child assigned his place.

(iv) When the game commences, the teacher sings the song appropriate to the game and when the children begin to understand the game and enter into its spirit, the song is also taught to them.

(v) We should not let the same child take the same part every day in the game.

(vi) The game should not be carried too far into the realm of reality; the simpler the game, the better it is.

Books of reference :—

(i) "Psychologic Foundations of Education." By Harris.
(ii) Berry's "Songs and Games."
(iii) "The Songs and Music of Froebel's Mother-play." By Susan Blow.
(iv) "Symbolic Education." By Susan Blow.

# LECTURE III.

NATURE-TEACHING, IN ITS BROADEST SENSE, THE BASIS FOR ALL EDUCATION AND INSTRUCTION.—THE PLACE OF GARDENING IN ANY GENERAL SCHEME OF EDUCATION.—EXPERIENCE PROVES THAT NATURE-TEACHING OR GARDENING SHOULD BE THE CENTRE-POINT OF ALL THE OTHER (SECULAR) WORK OF ANY SCHOOL FOR CHILDREN UP TO, AT LEAST, NINE YEARS OF AGE.—THE VALUABLE MEANS IT OFFERS FOR THE TEACHING OF MOST OF THE SCIENCES TO SCHOLARS OF MORE ADVANCED AGE.

A great change is going on in our educational methods to-day and we are beginning to see that it is "neither book nor any product of human skill, but life itself which yields the basis for all education and instruction, and that the proper environment for the rearing of little children is that in which they are brought into loving contact with some of the wonderful things of nature of which they also form a part." Nature is always sending her messengers to us. Whether we will or no, she is ever our companion and it is for us to help the children to interpret her messages correctly. Here in India, there are better opportunities for nature-study than in England. Seeds can be sown in this country at any time of the year and there are greater varieties of beautiful trees and lovely birds here than in that country. Teachers, when once they take to nature-teaching, would never like to get into other methods of teaching.

The term 'nature-study' is often supposed to mean 'instruction about some plants and some natural phenomena.' It has, however, a far wider significance. It implies 'putting the child into intimate relationship with nature so that a love of nature may be implanted in his mind. Love in its truest sense means doing something for the object cherished.' Hence children engaged in this work carefully tend the plants and animals which they have come to love. While doing so, they are gaining a host of experiences which will later on be the basis for formal instruction. The joy which children feel when they observe and tend plants, shows that they have an instinctive yearning towards nature. They eagerly watch for the sign of the cracking of the ground in the early spring, the putting forth of new leaves or bud in a plant, and their faces brighten up with pleasure while watching these things. Hence if at any period of life, it is during these most impressionable years that immediate contact with nature is of the utmost importance; for, as Froebel says, "an instinctive yearning drives the child to busy himself with natural objects. This instinct does not rest satisfied with apprehension of the facts of nature, nor of the secondary principles which govern these; its root lies far deeper. Stripped of all disguises it is the eternal search made by man after the first great personal cause—the Godhead. It is of the utmost importance that children should acquire the habit of cultivating a plot of ground of their own, long before the period of school-life begins, for this reason:—Nowhere as in the vegetable world can his action be so clearly traced by him entering in as a link in the chain of cause and effect. The effects are no less due to the intervention of his will than to the sequence of nature."

If it be true that the child has an innate love of nature, then communion with nature should have the first place in a school curriculum, and be the central point for all the other work. The children must be made to express what they see while in communion with nature. Thus drawing, clay-modelling, and building exercises may be utilized for expressing the ideas which children have learnt in nature-teaching. Later on children may like to hear what others have written about what they see in nature and we may use this curiosity to create in them a taste for reading.

The out-door garden offers the richest opportunities for putting children into intimate loving relationship with some of the things of nature, and frequent out-door rambles are also an aid in this direction. This intimate relationship with nature will lay a firm foundation for the teaching of science and religion which will follow later on.

When we come to consider the subjects that are suitable for nature-study, the plants in the garden take the first place. Next we can take up such subjects as the sun, the wind, the snow and the rain, which affect our plants in some way or other; then we may take up the study of such birds as sparrows and crows, which we always see in our garden. The insect pests of the garden such as the caterpillars and the snails may next become the subjects for special consideration, and lastly we may take up the study of such casual visitors to our garden as the beetles or the moths.

By thus interesting children in objects outside themselves we are teaching them altruism without their being conscious of it and giving them a happy memory of their childhood.

It need not be said that such work needs an enthusiastic lover of nature, who should also be a careful and skilful teacher. He should be a sympathetic guide who will enable children to read the divine message in every flower that blows or every creature that moves.

Miss Latter said she had so far dwelt on the general scope of the nature-study lesson and had also indicated what place it should take among the lessons of the infant school curriculum. She then explained the manner in which the teachers attended to that work in her school 'The Invicta.' They had a garden there 80 feet by 8 feet, which belonged to the whole school. This strip was divided lengthwise into two portions:—(i) A long strip 2 feet deep for a kitchen garden and (ii) a strip 4½ feet deep for a flower garden. The strip intended for a kitchen garden was divided into beds 4 feet by 2 feet by paths 1½ feet wide between each bed. The strip intended for the flower garden was also divided into beds 3 feet by 4½ feet by paths 1½ feet wide between any two beds. Thus there were 18 beds of each kind in that little garden. The borders and pathways were made of large and small stones gathered for the purpose by the children. Potatoes and other vegetable seeds were planted in the back beds and flower plants in the front beds. In one of those flower beds were planted the bulbs of the white lily, some blue squills and some yellow narcissi to tipify in living form the colours of her school as set forth on the flag. As stated above, the garden belonged to the whole school, but each class got six beds on which certain children worked for a year and thus followed the history of a plant or an animal visiting it. Generally two children worked on a bed 4 feet by 3½ feet. When the garden had to be cleared of weeds or when the seeds were ready for gathering, the owners of the beds for the time being invited some of their comrades to help them in their work. Those who could not have a bed in the garden were provided with in-door gardening in pots and boxes. The out-door gardening with little children was taken as group work with but a small number of children at a time, as it was not possible to manage a large class in the field. Twenty minutes were devoted each morning in every class to the care of natural objects by the children—to the setting, tending and watering of plants in and out of doors; the cleaning of the flower pots and saucers; the preparing of flower boxes and the feeding and tending of animal pets. To gardening in and out of doors at least 45 minutes a week were given, according to weather and needs. Twice a week 30 minutes were devoted in the morning to the consideration of special natural objects or phenomena. They selected one natural object on which specially to concentrate their thoughts and work for a few weeks. That did not prevent the general observation of the many things which came under their notice, but rather helped to show that 'nothing stands alone.' The object was considered not from a single point of view but from all sides—that is to say—in its relation to other plants, animals and natural phenomena and also as it affected the daily life of the children. The subjects were fixed upon and studied long before they actually became objects of special consideration in the school. The garden work was supplemented by walks to other places, so that a more extended glimpse of nature might be obtained.

While some children tended in-door and out-door plants, others observed the weather and recorded their observations under the heading 'Calendar work.'

When children went out to buy food for the doves, flower boxes, seeds for the garden, etc., they learnt measuring, weighing, and money values. Reading and literature were also connected with gardening whenever possible. Children under five did nothing in the way of reading and writing. They were wholly occupied in nature-work, Kindergarten occupations, games, stories and free play. They always used the very best literature and the very best art to supplement their nature-work. In this way their taste was cultivated.

## Planning the Work.

The real thing was the starting point. After some experience with the real thing came the search for an explanation and a further knowledge of facts gained from the very best authorities on the subject.

The point of view from which the subject should be presented to the children was next determined; then came the consideration of facts that were most suitable to children and the best means of helping them to find out these facts for themselves.

Lastly suggestions were offered as to the way in which the children might desire and be helped to reproduce their experiences in concrete form, be it with a few paints and a brush, chalk and paper, modelling paste, building bricks or even pen and ink; also as to how the ideal side of the subject might be presented in picture, story and verse.

# LECTURE IV.

THE EFFECT OF GARDENING UPON THE CHILD, THE SCHOOL AND SOCIETY AT LARGE.—THE RESPONSIBILITY OF EDUCATIONAL AUTHORITIES WITH REGARD TO THE QUESTION.

In considering the effect of gardening upon children, we must keep in view their threefold nature—physical, moral and intellectual. In the earliest years the physical nature is more predominant. Gardening being an out-door occupation, the child is constantly in fresh air, and thoroughly enjoys his work. His whole heart and soul are thrown into the work involuntarily and no task seems to be too much for him.

The child's work involves a variety of movements, and hence affords a natural outlet for much of that physical energy which, if left unprovided for, leads to rough play and unruly practices. The child is also unconsciously impressed with the sight of the pretty flowers, the graceful insects, and other wonderful little creatures which share the life of the garden; with the fragrance of the flowers and the fresh smell of the ground after a storm; and with the beauty of the heavens. He listens to the song of the birds; to the sound of the wind, now soft, now shrill or loud. He tastes the fruit of some of his labours. His senses are thus trained in a natural way without any effort and a host of delightful experiences gathered the while as a basis for future development.

Loving contact with and care for some of the wonderful things of nature around him, awakens in a child a strong feeling for the wonderful and the beautiful. Closely associated with the cultivation of sympathy with nature is the development of the æsthetic sense in children—the appreciation of the beautiful in their environment. Beauty does not mean merely the beauty of form and colour and structure, but the far higher beauty of function and adaptation or fitness for work and that highest manifestation of beauty shown in the unity of all nature. This feeling of beauty reacts upon the child and refines him. No child who has been engaged in the loving care of the garden will ever after pitilessly pull flowers to pieces, trample purposely upon a worm or snail; still less will he have any pleasure in catching butterflies and sticking them upon pieces of cork merely to make a collection. He will rather protect the lives of such marvellous creatures. From a love for the things of nature, the child rises to a deeper love and respect for his comrades and others and through that again, to a recollection of the all-wise, loving Father, the giver of all good things. The respect for plants and animals awakens respect for their environment and this ultimately leads to respect for the neighbour's property.

The garden also gives the child an opportunity for exercising the pleasure of giving. The flowers of the garden may be used to give an appearance of cheerfulness to the room of a comrade suffering from illness. In this act of giving, the parents and teachers are not also forgotten.

" The sights and sounds which give so much pleasure to the child must necessarily awaken in his mind a desire to know something about the garden, its inhabitants and the natural phenomena which affect it. This desire will be a motive for the development of the intellectual powers of the child. His powers of observation will be rendered keener and the knowledge that he gains in the garden will awaken in his mind a desire to know more. This is the time to give him books and teach him the art of reading.

The garden may also be made the basis of number-lessons. The number and the size of the beds and paths in the garden, the height of the various plants, the number of buds and full-blown flowers on a stem, the quantity of seed yielded by various plants, the amount of time required to dig up the potatoes in two or more beds of equal size—all these afford valuable exercises in arithmetic. Arithmetic in this form will appeal to the child more strongly than in any other."

Every hour spent in the garden means the opening of a fresh door to the child to the realms of science, art and literature.

The aims of nature-study, considering the development of the individual child, have been summarised by C. B. Scott in the following manner :—

(1) To awaken an interest and cultivate a sympathy with the physical environment.

(2) To cultivate the higher nature of the child—æsthetic, ethical and spiritual—and lead him towards God.

(3) To develop the intellectual powers and form right habits.

(4) To lead the child to acquire a knowledge of his physical environment.

Considering the child in his relation to school the following secondary or subordinate aims of nature-study are given by the same author :—

(i) To give the child an understanding and appreciation of nature which will enable him to enjoy and appreciate literature and art which have been inspired by nature.

(ii) To give the child clear impressions which will serve as a basis for the expressive work of the school—reading, modelling, drawing and such other subjects.

(iii) To give the child a clear knowledge of his immediate physical environment which will serve as a basis for his work in geography, the study of the broader environment.

Education is one organic whole. Hence nature-work should form a very important portion of the school work at least up to nine years, if not longer. Of course, there will be a difference in the mode of treatment between the junior and senior school. An example will make this plain. When studying the sun, the junior class observes the length of the shadow during the different months of the year, while the senior class not only measures the length of the shadow but measures the variation of the angle as well. The Botany lessons of the senior school will receive much help from the school garden. Domestic economy and cookery lessons of the senior school will also receive much aid from gardening. This work will awaken in the girls a newer and deeper interest in the things which have hitherto only had a market value for them. A practical knowledge of gardening is also acquired which will help the girl to grow some of her own vegetables and thus save something in the household expenses. As the pupils advance, the work becomes more systematised. At first, gardening is an affair of the heart, but later on the exact form of scientific enquiry predominates. And the child being only a unit of the school and the school, only a part of the community, if each individual of the school is developed in the way suggested above, the school as a whole and, through it, the community must enjoy a richer and fuller life.

It behoves educational authorities, then, to insist that a garden shall be attached to every school and that proper opportunities shall be afforded for the cultivation of the same by the children during school hours, and therefore as part of their school work, nay, as the centre for all the secular work of the school. We have human beings to train, not machines to guide. Miss Latter concluded by saying that she would feel happy if she could strike a chord in some of her hearers to follow her work after she left the shores of India.

# LECTURE V.

## EXAMPLE OF THE TREATMENT OF NATURAL OBJECTS ACCORDING TO FROEBELIAN PRINCIPLES.

The child has animal feeling and is born with a natural delight for objects of nature. In her last lecture, Miss Latter spoke about the preparation which teachers ought to make in planning such work. In this lecture she said she would try to show how such objects ought to be dealt with from the point of view of the children. In her school they took about eight subjects in a year and viewed them from all points. The teacher did not talk much, but got the children to busy themselves much and find out for themselves by using their senses and by being active with the things themselves. That was one of the differences between the old object lessons and the new method of nature-study. In the old object lesson, the teacher wrote much on the black-board ; not so in the newer method. Very little information was imparted by the teacher but much was learnt by the children themselves in the course of their garden work. The notes intended for use with a class of children were kept separate from the teacher's own notes. These were much more extensive and elaborate than those intended for use with a class of children. The subject was shown in its bearing upon their daily life. Thus when treating of *charcoal* they considered it from the point of its being useful for fuel, for fire in winter evening and for filtering water and gave practical effect to this by letting the children prepare a charcoal fire.

It may be asked, "Why should the teacher study deep the subject she is taking with a class of children?" In reply it may be said that she would not otherwise be able to guide the child properly. She may just miss the point useful from the point of view of the child and she may not be able to answer questions put by the children in a satisfactory manner. She may not be in a position to know that what she is giving is the very best or not.

In Miss Latter's school the list of subjects was drawn after considering the local circumstances (plants, industries, circumstances of the school, etc.). Each subject they took up occupied four or more weeks, whereas the old object lesson was finished in half an hour.

Hence in the present method much more concentration was possible. The child learnt to recognize similarity in diversity. In time he came to know a subject very well and found out the relation of that subject to other subjects and got therefore very much interested. The subjects for nature-study were also chosen according to the season of the year. They judged the results of their work by seeing whether the children became happier and more intelligent as they proceeded with their work. The improvement in hand-work was considered last, and even then, only if it expressed the child's inner thought and life.

In presenting the subject to the children the following course is generally adopted :—

(i) Name.
(ii) Relation to natural environment.
(iii) Habits or function (and life-history).
(iv) Structure (and life-history).
(v) Comparison, classification and association.
(vi) Application.

(i) With children only the common names are used. The name should be related to an idea. Whenever possible, the meaning of the name should be explained. Frequently the name may be associated with a story or legend, *e.g.*, Hyacinth, with the old Greek legend of the boy-friend of Apollo.

(ii) The relation to natural environment is taught not by bringing the object into the school room, but by taking the children out for a field-lesson to see the object in its home. A grasshopper, caterpillar or snail is best studied in its natural surroundings.

(iii) The habits or function of a subject is best studied as a field-lesson. The way a plant bends to the sun, the purpose of such bending, the arrangement of leaves, the falling and colouring of leaves, the relation of leaves and flowers to the sun, the work of earth-worms, frost and rain, the homes and habits of insects, birds and other animals—all these can be studied with profit as out-door lessons and under natural conditions. In these out-door lessons it is not necessary to maintain that rigid order that we have in the class room. If a field lesson with a class is or seems impossible, the teacher will find it convenient to go out only with a few pupils after school. For the study of many things such as ants, crickets, mallows, trees, birds, butter-cups, stones, earth-worms and the dissemination of seeds it may be necessary to go out only a few hundred feet from the school house.

(iv) The study of habit, function and development is the best possible preparation for an understanding of structure. Structure is best studied in the class room with the aid of appliances and is related to function. Hence those features of the structure should be emphasized which throw light on function including use to man. In studying structure, study and describe the whole thing before taking up its divisions, and in describing parts, relate them to the whole, and study those parts first which interest the children most. In studying structure careful drawings by pupils will be helpful towards accurate description. In describing structure, we must be careful not to use too many scientific terms. We may use such technical terms as are in common use but for the rest of the description we must use words carefully selected from those that are in ordinary usage. In the higher classes, where more exact expression is needed, we can bring in scientific terms to a greater extent.

(v) As our aim is to unify knowledge, the object or phenomenon studied must now be compared with others like and unlike it, and what is like, grouped and what is unlike, separated. Thus the objects we have studied will become not individuals, but types of classes. Thus the grasshopper will become the type of hundreds of insects, the silk-worm of hundreds of caterpillars, the bean of several varieties of bean, etc. In this comparison and classification, the child must carefully note resemblances and differences, distinguish the essential from the non-essential, abstract the general principles or laws and apply such laws to other phenomena. Success in classification depends upon a careful study of structure.

(vi) The last step in nature-study is the application of what has been learnt to allied subjects or phenomena. Thus after learning about conduction of heat, the knowledge should be applied to such topics as clothing, storm-windows, etc. Similarly from the study of dandelion seeds with hairy cells we may pass on to hairy cotton seeds, the cultivation and processes of manufacture and the great value of cotton.

What has been learnt in nature-work should be applied to other school-work. Thus nature-study becomes the basis for physical geography and will be very helpful in commercial geography.

The method of conducting nature-lessons with young children will become plain by the following schemes of nature-work.

### SPECIAL SUBJECT FOR CONSIDERATION.

### The Shoe-flower—Hibiscus.

### Rosa Sinensis.

The stand-point from which the subject is to be considered :—

"*To let the spiritual* unbidden and unconscious grow up through the common. Let this be our symphony."

The shoe-flower is extremely common in this country and the children are familiar with it. Hence it is a fitting subject on which to concentrate our attention for a few weeks and endeavour to awaken in the child a love and reverence for some of the beautiful things of nature which are in close touch with his every-day life. The tightly closed bud waiting for the magic touch of the sun to open and disclose the secrets within, with the gradual pushing of that something within until the folded flower is visible, will fascinate even the youngest children; but what will be their joy when the folded flower spreads out its leaves and reveals itself in all its glory! Yet this is not all. Inside the flower are wonderful secrets still to be revealed, the wonderful arrangements for the propagation of species; and here we are very near the great and exquisite mystery of life. Reverence and love are needed here. Nature thus provides us with more fascinating stories than could be brought out from the brain of man. She only asks of us a loving heart, a seeing eye and a listening ear. In approaching nature in this way with our children we not only want them to feel the beauty of the flower but wherein that beauty consists, to wit, in the simplicity and adaptability of every part of the flower to the use it has to serve. But there is a deeper thought which will be awakened in children as they are helped to see the plan and order of the beautiful flower under their special care and observation—the thought of the Great Planner who fills the earth with so much beauty and is ever ready to give his great bounty to those who will lovingly watch and tend the lower receptacles of his wonderful power.

### PLAN OF WORKING THE SUBJECT WITH CHILDREN.

(i) A little chat about the season.—

The children name some of the flowers which are to be found in the paths and gardens. They go out in the compound to see what flowers are out there on tree, bush or plant. The shoe-flower bushes are observed, the general appearance of one bush is noticed and the height compared with that of a child. How many children are needed to encircle the bush? What is the number of pretty flowers out on one bush? On other bushes?

(ii) Examination of the stems of the special bush in the compound. Some are thick and woody, whilst others are thin and green. What does this difference tell us? The way the stems come up from the ground is then noticed. Some stems are cut from the bushes for closer examination. The pretty marks on the woody stems and the work of the stems (in higher classes) are next noticed.

(iii) The leaves.—

Sprays are gathered from one of the bushes in the garden for special examination. The stems of the shoe-plants are examined in-doors also. What do the children find on the stems? How are they fastened to the stems? What do the children find between the stock, and the leaf and the main stem? The character of the leaf-stalk is noticed. The leaf-colour, shape and size, the appearance of the upper surface and the under surface—the age of the leaf, the work of the leaves (in higher classes).

(iv) The flower bud.—

Other things besides leaves are found on some of the stems of our bush. The children examine bushes in the compound and find a number of green knob-like things on some stalks. In these there is something pretty waiting to be awakened by the sun. See how they are held up to the sun—the beauty of the bud, the lovely green colour, the markings on the bud, the leaf-like arrangement round the opening bud. Some buds are found which have opened a little. What can we see now? Just a little of the dainty flower within. Other buds still more open are found. The children notice the way the flower is wrapped in the bud and the gradual pushing forth of the flower. Some flowers are gathered and kept in water in-doors.

(v) The full-blown flower.—

The general appearance, the size, the graceful shape and the rosy colour are observed. The covering of the bud now forms a dainty little cup for the flower to sit on. The number of points to the cup (calyx) are counted. Some have pale yellowish-white flowers, some salmon flowers; the children find some flowers of each variety in the compound.

(vi) The flower leaves (petals).—

Their number, shape and size are noticed. The seed is fastened to something at the bottom. The children press the bottom and find something hard. They will presently find out what it is. The beautiful markings on the flower leaves, velvety face, the colour lighter at the back, arrangement of the flower leaves, the reason for such arrangement (in higher classes) are brought to children's notice. Something right inside which has to be taken care of. Buds and flowers are kept in school and watched. They open in the morning and close at night. What do we find when we look inside? Deep colour and a lovely rose-coloured column standing out. All round the upper part of it are curious thread-like spikes, each having a golden knob at the end. The top of the rosy column seems to open for another inner column which separates into five tiny shafts, each having a little red knob or sticky cushion at the end. What can these be? The children gently touch the golden knob. Something comes off on their fingers—a fine yellow dust. Somebody in the compound is very fond of yellow dust like this. The children must watch and find out whether any little creatures visit the shoe-flowers and if so why?

(vii) The fruit of the plant.—

The children watch when the flower has fallen out of the stalk and look what is left on the stalk. We find a hard knob. This is the plant's treasure-box. Some day we may be able to look inside; we should spoil the box if we try to open it now. Can the children think what that hard thing was which they felt at the bottom of the flower one day?

(viii) The ripened fruit or seed box.—

The treasure-box is examined when ripe. Its appearance is noticed. What has happened to some of the boxes? The way the plant opens its treasure-box and the inside of the box are then observed. The treasures (seeds) are placed in shallow dishes and left in the sun to dry. Paper bags are made, and labelled by children; dry seeds are put in, fastened and stored away for future use.

(ix) Why we like the shoe-flower.—

For decoration, medicine, hedges; and leaves are used in cooking.

(x) Work in the garden.—

Watering the plants, tidying of beds and paths, giving a support when necessary to the runner beans, taking flowers and cuttings from the shoe-flower bushes, planting some in the flower beds, others in pots for the rooms of the school—these are some of the occupations in which the children may be engaged in the school garden.

## ANOTHER SUBJECT FOR SPECIAL CONSIDERATION.

### The Broad-bean.

"Beauty is planted with the seed. And till
The flower puts forth its perfect summer dress
Grows with it waxing rich and richer still."

We choose the broad-bean for special consideration this and next month (September and October) in order that the children may further follow its wonderful life-history. We have already seen how the baby plant is provided for in infancy. The pocket in which the little seed is ensconced—a pocket more magical than even the box of Pandora, the feeding tube and the plentiful supply of food have all been noticed. We have watched how the plant behaves when it makes its way up out of the earth.

We now come to the full-grown plant with its 'butterfly' flowers and the tale becomes more enchanting than ever. Observe the large outer leaf wrapping round the remainder of the flower in the bud and then opening out later like a fine-striped standard to shelter the interior organs from wind and wet; the two smaller side leaves with magnificent black markings suggesting the wings of a dainty butterfly; within these leaves a kind of little box consisting really of two leaves so arranged as to protect still more securely the seed organs—the plant's treasure-box and the wonderful treasures. A little later and we behold the ripened pod with the mystery of incipient life.

Surely no more beautiful or fascinating story could be evolved from the most imaginative brain! Yet this is but one of the countless fairy tales scattered all about God's beautiful world waiting to be read.

Plan of the work with the children.—

"Each thing upwards tends by necessity decreed,
And the world's support depends on the shooting of a seed."

Sowing time recalled and the name of the seeds sown. The largest seed sown this year. Do the children remember anything wonderful about the coat of the broad-bean? Children tell how the bean behaved as it came up above the ground.

Visit to the bean beds in the garden; height of some of the plants. Examination of some of the bean plants in and out of doors. The upright angular stems, the leaves, their shape and colour. The way the edges of the young leaves roll in towards the centre. Other tiny leaf-like things found on the stem, what they are, the curious markings on them. The flowers where placed on the stem. How they grow (singly or otherwise), their colour, their dainty butterfly forms, their fragrant perfume.

Bean plants in the garden visited again. A few flowers brought into school and looked at. The children tell what they see. A big flower leaf overshadowing the rest of the flower. It makes one think of a fine flag with its beautiful stripes. Two side-leaves like a pair of butterfly wings seem to be folding over something very curious—a kind of little boat (drawing useful here). There is something very precious in that little boat—the plant's treasure-box. By and by we may be able to see the treasure-box and its contents.

Visitors to the plant in the garden.—

Individual children watch and find out what the bee does when it visits a bean flower.

Visit to the bean beds in the garden again.—

What has happened to the bean plants? The pretty flowers have gone. Something very wonderful is seen in their place—the plant's treasure-box. Its beauty, its downy cover when first seen. The contents of the treasure-box are good to eat. We will gather some of the treasure-boxes and after we have looked at them, prepare the contents for eating.

Bean pods gathered (a few left for ripening). Examination of the pods and their contents, shape, size and colour of the pod. The way the pod opens. What we find inside. Arrangement for the cooking of school beans. Bean feast.

Gathering in of pods left to ripen in the garden. Examination of ripened pods and seeds. Seeds stored away for future use. Taking up of spent plants from the beds.

General work in the garden.—

Digging up of beds in the garden. Watering and care of plants generally. Weeding and tidying of beds and paths. Giving the bean plants support where necessary (Guarding against the black-fly). Gathering in of pods.

# LECTURE VI.

## THE RELATION OF HAND-WORK TO NATURE-WORK.

Before discussing the relation of hand-work to nature-work it is necessary for us to know something about the nature and the scope of hand-work.

Every healthy child is constantly engaged in some form of hand-work or other. The mother who is familiar with this trait of childhood will at once think that her child is unwell if it does not occupy itself in some form of occupation or other. Hence we see that activity is the most important characteristic of infancy. During childhood this activity shows itself mostly as bodily activity, and here too, it is manual activity that predominates over every other form of it. As education should be suited to child-nature, the educator should try to develop only such powers as manifest themselves in a prominent degree at the time. It is exercise that strengthens faculty. Hence educators must make hand-work an important part of infant education. Manual dexterity being a peculiarity that distinguishes men from other animals, is it not our duty to develop this power peculiar to the human race?

It is wrong to consider that it is only the hand that is being trained when we try to develop the manual dexterity of the child. The eye is also trained along with the hand. The child is not a mere machine. While engaged in hand-work, he has to think out the ways and means of doing it. Hence mental development is also an important result of well-conducted hand-work.

The advantages of hand-work may be briefly summarised as follows :—

(i) The knowledge that is acquired by the correlation of hand-work with intellectual work is more exact than that which is acquired by the mere use of intellect.

(ii) A person who engages himself in hand-work has a better perception of beauty and refinement in work than one who is a stranger to manual labour.

(iii) Hand-work teaches self-reliance.

(iv) There is more pleasure when anything is learnt by correlating it to hand-work than when it is learnt by the mere use of the intellect.

(v) Hand-work also improves bodily health.

(vi) The repugnance which many educated people show towards manual work, will disappear when such people are taught hand-work from infancy.

From what has been said above it is evident that hand-work should form a necessary part of any scheme of general education. We should not imagine that hand-work should form a necessary part of general education only in the infant classes. It should be a part of general education right up to the end of the secondary course. The work should be graded according to the age of the children. Kindergarten occupations in the infant classes, card-board work in the lower secondary grades, and wood and metal work in the upper secondary grades, seems to be a suitable gradation.

Teachers in determining the kind and quality of hand-work to be done in the infant classes should remember the following points.—

(i) The work that we give to children must be interesting to them and must be suited to their capacity.

(ii) It should be capable of being finished in a short time.

(iii) It should be correlated to the nature-work going on in the school at the time.

(iv) From young children we should not expect very exact work.

The various kinds of hand-work suitable to young children are:—

(i) Moulding.—This is perhaps the best and the simplest means of expression for little children. With clay they can express the forms of solids exactly as they see them. Clay is so plastic that it can easily be modified. In plant-study there are greater opportunities for modelling than in the study of animals.

(ii) Sand-work is similar to clay work; only the forms of objects cannot be so well expressed in sand as in clay.

(iii) Paper-folding, stick and ring laying and thread-laying are valuable means of expression of form. They can be used with advantage in connection with nature-work.

(iv) Building boxes are also a valuable means of expression of form.

(v) Drawing is perhaps the best means that the child has for expressing his inner self. It is a universal language.

So far something has been said about the scope of hand-work as a part of general education. It will now be shown how this work may be connected with the central lesson of the school, *viz.*, nature-study. In the fifth lecture, two examples of the treatment of natural objects according to Froebelian principles were given. In this lecture it will be shown how hand-work and other parts of school-work may be correlated to nature-work.

### SCHEME OF CORRELATION IN CONNECTION WITH THE STUDY OF SHOE-FLOWER.

(i) *Drawing.*—The shoe-flower bush, a single leaf, a spray with leaves, a stem with a bud, a single flower, a spray with flowers, flower vases, flower pot, watering-can—all these should be drawn by children. If time permits they may also draw the other flowers of the season. The most suitable materials at this stage are brown paper and chalk.

(ii) *Modelling in clay.*—Children model with clay or plasticine a flower pot, a leaf, a spray with leaves, a bud, a shoe-flower, a watering-can, a vase, while studying the shoe-flower.

*Brush-work.*—Single leaf, several leaves on a stem, the bud, the flower peeping out, the full-blown flower.

*Paper-folding.*—A vase, a flower pot, seed boxes, a basket, a double-flower-vase—these are a few of the exercises that children can do in connection with the shoe-flower study. They may use square or oblong paper for this work.

*Gift IV.*—A compound wall, garden house, garden well, flower stand, cupboard, garden seats, and gate—these are some of the exercises that can be done with the material.

*Stick and ring laying.*—A vase, a flower pot, a watering-can, and garden tools.

*Sand-work.*—A garden path, plan of garden beds, the shoe-flower bed being indicated.

*Fraying.*—Little brooms to sweep the sand-garden, little mats to go under the flower pot, little dolls to scare birds.

*Gift II.*—The cylinder may be considered as a garden roller or as a water pot, while the children play with it.

Games:—(i) *Come with me to the garden away.*

(Froebel's Mother-Play.)

(ii) *Away among the blossoms.*
(Berry's Songs and Games.)
(iii) *Little Anne's Garden.*
(Poulsson's Holiday Songs and Games.)

Recitation:—(i) A Mystery (Gabriel Setoun).
(ii) Summer (Miss Cairee).

Pictures:—Fitzroy pictures.

Stories:—(i) Ceres and Persephone.
(ii) Inside the garden gate.

### SCHEME OF CORRELATION IN CONNECTION WITH THE STUDY OF THE BROAD-BEAN.

(i) *Drawing and moulding.*—The plant in different stages of growth, leaf, flower, bean pods open and closed, seeds, basket, saucepan, dish and window.

(ii) *Brush-work.*—Leaf in different stages of growth, flower, pods and seeds.

(iii) *Paper-folding.*—Basket, flower pot, dish, table, table-cloth, salt cellar and window.

(iv) *Gift IV.*—Fence, garden, fire-place, kitchen-table, well, and basket.

(v) *Gift III.*—Window, garden, fire-grate, kitchen-table, pump and salt-cellar.

(vi) *Tablets.*—Objects made with Gift III reproduced on the plate.

(vii) *Sticks and rings.*—Window, flower pot, saucepan, dish, spade, watering-can, leaf and basket.

(viii) *Fraying.*—Dolly's table-cloth.

(ix) *Gift II.*—The cube as a garden seat.

(x) *Sand-work.*—Kitchen-garden, field.

(xi) *Games.*—(1) The wheelbarrow.
(2) In my little garden bed (Poulsson).

(xii) *Stories.*—(1) The straw, the coal and the bean.
(2) Five peas in a pod.
(3) How the beans come up.
(4) Jack and the Bean Stalk.

(xiii) *Pictures.*—(1) Happy days.
(2) A day in the country.

# LECTURE VII.

ON THE USE OF STORIES AS AN EDUCATIONAL MEANS.—CLASSIFICATION OF STORIES.—SUGGESTIONS FOR THE GUIDANCE OF TEACHERS IN THE TELLING OF STORIES.

Children at all ages and in all countries like stories. They have a natural craving for them. This instinct does not die with childhood. The eager delight with which children beg for a story and listen to it while it is told, is in itself a plea for them. To them, stories are a 'spice' and their natural desire should therefore be satisfied.

Uses of stories.—

(i) Stories extend the child's experience of the world.

(ii) Stories strengthen the child's powers of observation and imagination. The teacher should therefore be careful to develop the faculty of imagination in the right direction.

(iii) By means of stories we can supply children with illustrations of the laws which govern life. For instance, we may tell children that the untruthful person is distrusted and an unpunctual person suffers inconveniences and annoyances of his own making, that a forgiving temper is much better than a revengeful temper. The causes and consequences which we represent in ideal actions will make a very deep impression on the infant mind.

(iv) Another use of stories is that we can introduce the child into the grand world of all that is noble and beautiful in conduct. The child thus sympathises with noble actions prompted by pure motives and unconsciously would apply them to his own circumstances if we are careful to afford him an opportunity of acting in this sense.

(v) Stories are a valuable means of helping the children to acquire familiarity with language. The child's vocabulary is enlarged.

In stories the teacher has capital opportunities for influencing the character of children. Children imitate what they admire. The noble characters in stories exercise an important influence on children and they will strive to be so. Stories will cultivate and develop the child's sympathies. He becomes intensely interested in the subject of the story and for the time being lives the incident over again in his own little life.

Stories can be divided into two classes:

(1) Ideal or imaginative.
(2) Realistic.

Ideal stories include fairy tales, allegories and fables. Realistic stories include nature stories, travels, history, biography and adventure.

*Fairy tales.*—Some people object to fairy tales, but innocent fairy tales feed the imagination. The true significance of fairy tales is *spiritual,* but many stories with that title have no claim to it. Some great spiritual truth underlies the genuine fairy tales. The so-called fairy tales which are merely jumbles of impossible incidents and which often present dishonesty, deceit and cruelty in an attractive and amusing guise, are of no educational value. By the narration of such stories the children soon learn to take delight in this class of stories and as a consequence character deteriorates. Such stories as 'Blue-beard' should never be narrated to children. But 'Cinderella' 'Sleeping Beauty' and such other stories cannot exercise any harmful effect upon children. In all genuine fairy stories, there is always found at the heart some great spiritual truth which forms the soul, as it were, of the story. The incidents of the story are all designed for the purpose of showing this truth and what makes it fairy is, that, in order to give scope for the working out of the truth, fancy creates a world for the action of it—a world in which there is no restriction as regards natural law and rational necessities. It is in fact a kind of superior action given to spirit over matter. We find throughout such stories that the play of fancy is not the mere irregular wandering of a dream, but that there is a unity of design in the incidents, while at the heart of all of them lies some great moral truth which gives them their hold on generation after generation and will preserve them in all perpetual freshness of child-like beauty as long as the world shall last.

*Fables.*—Fables are stories of imagination in so far as they attribute speech to animals. They are more or less of a satire and require to be carefully used.

*Allegories.*—Allegories are more spiritual than fairy tales and are of less human interest. The personages of the story are not human beings but represent abstract qualities. The scene, though taken from the material world, is composed of objects most of which are symbols. There is consequently less unity of idea and less unity of art in the construction of allegories. They serve the purpose of indirect teaching and moral training. They are also useful in training children to understand symbols and to see readily the relation of form to essence and the fitness of certain material things to express abstract qualities. They prepare them not only for the later study of the great classic Allegories but also for the understanding of poetry. They also enable them to see the beauty of material form and the deeper truths which it teaches.

The guiding points in the selection of stories:—

(i) The story must be suited to the age and attainments of the children. For the youngest children between three and five years old, simple nursery rhymes are best suited.

(ii) The story should be the best of its kind. It is always safe to resort to the very best authors for the stories and thus introduce children to what is best in literature. As the child's taste is in a large measure influenced by the class of stories told to him in early life, the responsibility of the teacher in this matter is very great.

(iii) The story should be interesting, pointed, and not at all vague.

Children who have heard many stories and whose minds are active will sometimes invent stories. This should always be encouraged. Every effort at original work strengthens the child's faculties and makes him more capable.

## Realistic Stories.

To these belong stories of nature, history, biography, travels, and adventure. They are best suited to illustrate the laws by which life is commonly governed and to show to children that the consequences which follow conduct are as sure as the sequence of cause and effect in the material world.

A good realistic story consists of one general law of life shown in its ordinary legitimate action. The scenes for the action must be those of the real world and they must be of the part of the world which the children know a little.

Though a realistic story is thus a sketch from nature, it must be a picture and not a mere photograph. The attempt to imitate exactly the sayings and doings of children, though very amusing to read, is not real literature, because there is no artistic purpose or design in it. Realistic stories for children must not only be true to life but true to the life of children.

## HOW TO TELL STORIES.

Stories should be told and not read. They must be suited to the ages and capabilities of children. The teacher should tell the story in an interesting manner and in simple, clear, and well-chosen language, laying emphasis on the points which he wishes the children to notice and by which he hopes to influence their character. The voice should be modulated in the telling of a story. Story-telling becomes effective when gesticulations are used; *e.g.*, the flying of birds, the rustling of leaves, etc., should be accompanied by hand movements on the part of the teacher. In narrating stories always the same version should be given. Stories should be in harmony with the surroundings of the child and should be connected with the central thought of the school. In complicated stories, it is better to confine to one time and action and then take up another. It is not good to mix up the several incidents and characters. The teacher should be in sympathy with the subject of the story and also with the children; otherwise interest will be lost. Stories should be the best of their kind. Pictures should be freely used to illustrate stories. This adds interest to a story. Black-board illustrations may also be given. Sometimes the children may be allowed to draw for themselves objects which have been mentioned in the story. After the story and the chat about it are finished, the children may be made to tell the story in their own words helped by the teacher, if necessary. This trains the children to express themselves accurately and well.

## CLASSIFICATION OF STORY BOOKS.

(i) Those for the cultivation of the imagination:—

Fairy Tales selected from Grimm, Anderson, Hauff, Henry Marlow and Andrew Lang; Kingsley's 'Water Babies.'

(ii) Fables and Parables:—

Æsop's Fables; Fables by Fairy Nesbit; 'Parables from Nature' by Mrs. Gatty; 'Favourite Greek Myths' by L. Hyde; Nature Myths and Stories for Young Children' by Flora Cooke.

(iii) Natural History Series:—

(*a*) 'Homes Underground,' 'Glimpses into Petland,' 'Strange Dwellers,' by J. E. Wood.

(*b*) 'Winners in Life's Race,' 'Life and Her Children,' 'Eyes and No Eyes' by Arabella Buckley.

  - (*c*) 'Life in the Woods,' 'Paws and Claws,' by the S. P. C. K.
  - (*d*) 'Animal Stories' by Andrew Lang.
  - (*e*) 'Jungle Stories' by Rudyard Kipling.
  - (*f*) 'Wings and Stings' by Mrs. Molesworth.
- (iv) Stories of Life and Conduct:—
  - (*a*) 'Child's Pictorial Magazine' by the S. P. C. K. Press.
  - (*b*) 'True Tales for my Grandsons' by S. W. Baker.
- (v) Stories of History and Biography:—
  - (*a*) 'Heroes' by Kingsley.
  - (*b*) 'Cameos' by C. Younge.
  - (*c*) 'The Tales of a Grandfather' by Scott.
  - (*d*) 'History Stories' by Sir E. W. Cork.
  - (*e*) 'A Book of Golden Deeds' by Miss Younge.
  - (*f*) 'A Book of Worthies.'
  - (*g*) 'In the Child's World' by Poulsson.
  - (*h*) 'In Story-land' by Elizabeth Harrison.
  - (*i*) 'Half-a-Hundred Stories' by Milton Bradley Company.

## LECTURE VIII.

POEMS AND SONGS.—THOUGHTS WHICH SHOULD GUIDE TEACHERS IN THE SELECTION OF POEMS AND SONGS.

It is not possible to teach poems to a child as soon as he enters the Kindergarten, that is to say, when he is about three years old. What can really be called Poetry cannot be taught to children till they are at least five years old.

By means of poems the ideal side of life is represented. Pictures are also a great help in this direction. By the study of poems the child's language is improved and his taste cultivated. The imagination of the child is called forth and exercised in the best manner possible. The sympathy of the child is awakened and developed by means of good poetry. Memory is also exercised.

Poems.—The poems that we select should be simple, suited to the age of the child and should mainly embody the child's experience. The poems should be the best of their kind and should be connected with the central work of the school. The story of the poem should be first related using as much as possible the language of the poem. A black-board illustration of the story may then be shown. Afterwards the poem may be learnt by heart. In recitation, clearness of speech and modulation of voice should be insisted upon.

List of books containing verses suitable for children :—

(i) 'A Book of Verses for Children' by E. Vere Lucas.
(ii) 'The Child World' by Gabriel Setoun.
(iii) 'The Pomander Verse' by Edith Nesbit.
(iv) 'Sing-song' by C. Rosette.
(v) 'Poems and Verses' by Mary Maps Dodge.
(vi) 'When Life is Young' by Mary Maps Dodge.
(vii) 'A String of Pearls' by Lady Lindsay.
(viii) 'Little English Poems' by C. L. Thomson.
(ix) 'Little Folk's Land by H. G. Groser.

Of course, good, simple, Indian poems have to be selected to suit Indian children.

Songs :—

Every one has seen the mother rocking her infant in her arms or in a cradle, singing a lullaby in time with the rocking. Why is this ? Because the mother knows full well that the child loves measured sounds and measured movements. Froebel was also well aware of this innate craving of the child. During his visits from hut to hut, among the German peasants he collected verses, fragments of songs, etc., from mothers, sifted them, rejecting those that were useless and keeping those that had an educational value. He incorporated all those he retained in his 'Mother Play.' The songs exercise a refining influence on the children. They make the children gentle and give them a taste for whatever is beautiful, noble and sublime. The songs selected should be simple, melodious and easy-flowing. With younger children the songs need not exceed six or seven notes.

The movements that are to accompany the songs strengthen the child's limbs, develop self-control and make the body of the child stronger and healthier. The activity of the hands also tends to increase the power of the brain. Doctors say that the use of both the hands equally develops both sides of the brain equally. Hence it is essential that the children should use both hands whenever possible whether in games, or in such occupations as drawing and writing.

It is always a good plan to have one or two finger plays at the close of each lesson. Such plays afford relief from the strain of work.

The directions for games should generally emanate from the teacher. But it is rather nice and interesting to get the children's own thoughts. So it is advantageous to ask children as to how any game should be played and get their suggestion whenever possible or convenient. The actions and gestures should be quite appropriate to the game. All games should be opened with a little chat with the children asking them how they can play, what they can do and so on.

List of books on Kindergarten Songs and Games :—

(i) 'Songs for Little Children' by E. Smith.
(ii) 'Kindergarten Chimes' by K. D. Wiggin.
(iii) 'Boston Songs and Games for Little Ones' by Walker and Jenks.
(iv) 'Holiday Songs and Every-day Songs and Games' by E. Poulsson.
(v) 'Finger Plays for Nursery and Kindergarten' by Miss Latter.

(vi) 'Stories in Song for Kindergarten' by M. J. Hill.
(vii) 'Songs and Music of Froebel's Mother-Play' by S. Blow (in two volumes).

It has already been said that pictures are an important aid to the teaching of poems. They are of great educational value if they are of the right kind. If they are child-like, they appeal to the children most, even if they are foreign. They should be such that they suggest some good story or noble act. They should invariably be related to the central thought of the school whatever that may be. They should not be chimerical but should contain some human interest. They must be pretty and particularly good.

With younger children these pictures may be used for conversation lessons. Older children may reflect upon the picture and say something about what they see. The children may be encouraged to express the idea of a picture by means of finger plays. They may also be encouraged to draw their own pictures illustrative of what they learn in poems. While they are engaged in this manner the teacher will go round, direct, guide, and encourage them to reproduce their ideas in drawings.

# LECTURE IX.

On the teaching of colour, form and number.—The advantages of kindergarten methods for this kind of instruction.

It is by no means an easy task to give ideas of form, colour and number to little children. Children cannot easily grasp them as they are abstract notions. Hence it is the duty of teachers to carefully search for methods of teaching these notions to little children. To assist the teachers in this difficult task, Froebel in his Kindergarten has indicated the best methods of conveying these ideas to little children.

Let us see how far Froebel helps us in the task of giving notions of form to little children. In his first gift, Froebel has taken up the simplest and the easiest of forms, *viz.*, the sphere. The child is familiar with this form in the plaything he uses every day, *viz.*, the ball. In the second gift he has taken up the sphere, the cube and the cylinder, and shown how one form can be developed from another. To show that the cylinder can be developed from the cube and the sphere from the cylinder, he has devised the expedient of hanging these forms by means of strings and revolving them. In the third gift Froebel has shown that objects, though of different sizes, may be of the same form. In the fourth gift Froebel has introduced a new form, *viz.*, the oblong. In the fifth gift the child becomes acquainted with some more new forms, namely, the triangle, the pyramid and the prism. In the sixth gift the child learns how square pieces and pillars are cut out of oblongs. The seventh gift introduces the child to various kinds of triangles. In the remaining gifts and occupations, the teaching of form is one of the main aims of Froebel. Drawing and clay-modelling are very valuable occupations to teach the idea of form to children. The various kinds of leaves, flowers and fruits of the school garden give valuable ideas of form in the easiest manner possible. Thus Froebel gives us invaluable help in our attempt to convey the idea of form to the child.

Let us now see what facilities there are in the Kindergarten system to convey the notion of colour to the child. As colour attracts the child even from the earliest years, Froebel has introduced it in the very first plaything he puts into the hands of the child. The six balls of the first gift are of six different colours, three of these being primary, and three secondary. It is not necessary that very young children should learn the difference between primary and secondary colours. It is enough if they learn the names of these colours and give the names of familiar objects of those colours. The laws governing the mixture of colours may be taught later on. Paper-plaiting, bead-work, fraying, chalk-drawing, brush-work,—all these occupations give us valuable help in our attempt to teach the harmony of colours. But nowhere can we learn such valuable lessons on colour as we do in nature. No artificial pigment possesses that purity of colour which we find in God's work, and no human hand can blend colours in such a harmonious manner as we see in God's pictures.

Pictures, colour charts and films, the flowers and fruits of nature, coloured worsted, these are some of the things we use while giving lessons on colour. Our aim in the first lessons on colour should be to make the children familiar with the six colours of the first gift. While naming any colour the children should couple a familiar example with it, *e.g.*, red as the cock's-comb, black as hair, yellow as the autumn leaves and so on. The garden should be the most important aid in teaching harmony of colours. The blue cosmos has a yellow centre, the white chrysanthemum a yellow centre, and so on. These and such other examples should be made use of to show how harmoniously the colours of nature are blended. The children may decorate their dolls and judge of the harmony of colours while engaged in this occupation.

The children should be made familiar with the primary colours before any attempt is made to teach them the secondary or tertiary colours. The colour charts and films come in handy in our attempt to teach the laws of mixture. But the best method of showing how secondary and tertiary colours are formed from the primary is that of letting the children themselves make these colours by mixing the primary colours. Let children prepare yellow colour in a glass vesse and blue colour in another. Let them take a small quantity of one colour and put it into a third vessel and then add the other colour to this drop by drop. They will note the gradual change of tint and will finally observe that the colour of the liquid in the third bottle becomes beautiful green. They can prepare other secondary or tertiary colours in a similar way. Or the children may be made to paint a yellow circle and superimpose a blue circle on a portion and note that the tint of the superimposed portion is neither yellow nor blue but green. It is absolutely necessary to engage children in such occupations during the progress of the colour lessons, for they create the interest necessary for the proper understanding of the laws of colour.

After a few lessons have been given on form and colour, stories in which both form and colour are combined may also be told. An example of such a story is given below:—

"John Roberts, a farmer, had three sons, Henry, Thomas and William. These children wished to have a garden of their own and requested their papa to give them a small plot for the purpose. The father was very glad to hear of this proposal and gave up a portion of his kitchen-garden for their sake. Henry prepared a round bed and planted in it a rose twig bearing beautiful red flowers. Thomas in his square bed planted rows of sunflower plants bearing beautiful golden-yellow flowers. William prepared an oblong bed and in the middle of this bed he planted rows of larkspur bearing sky-blue flowers, and all round the border he planted chrysanthemums bearing yellow flowers. These three boys had two little sisters Mary and Anne. After a look at the beautiful beds prepared by their brothers, they too wished to have beds of their own and requested their papa to give them small plots for the purpose. The father was very glad to do so. Mary prepared a semi-circular bed and planted in it marigolds bearing orange-coloured flowers. Anne prepared a bed of the shape of the crescent moon and in her little bed she planted balsams bearing charming flowers in which red, violet, pink and white were all beautifully mingled together. It was a wonderful sight to see all these plants grow up and put forth flowers of beautiful shapes and colours. Children, would you not like to have a similar garden of your own?"

After telling this story the children may be made to draw the forms of the beds told in the story and they may also be asked to paste in their beds paper flowers corresponding to the names occurring in the story.

## NUMBER.

The materials used in the gifts and occupations of the Kindergarten, such as building boxes, sticks, rings and tablets and may be used to give the idea of number to little children. Some of these may also be used in bringing home to them a knowledge of fractions. If to these we add charts containing dots, the ball frame, bags of marbles and bundles of sticks, the materials at our command for conveying exact notions of numbers will be much enhanced. Arithmetic taught in this manner will not try the patience of little children. Many teachers are aware of the use of concrete objects in the teaching of Arithmetic, but their use of the concrete begins and ends with the ball-frame. After a time, even the sight of the ball-frame becomes disgusting to little children. These teachers seem to forget that, to give interest to the lesson, various kinds of concrete things should be used in lessons on number.

If stories and games are connected with lessons on number, the interest of the children will be doubled. The following illustration will show how stories and games should be connected with lessons on number:—

"A farmer had a farm-yard in which he kept a number of sheep and lambs and to protect them from wolves he kept two watch dogs also. One day he took the sheep and lambs out for grazing and brought them back in the evening. First came twelve sheep four in each row, then came eight lambs bleating as they came. How many animals were there? Then was heard the barking of the watch dogs and in rushed both of them. How many animals were there now? Next came in a fierce wolf lolling his tongue and ready to pounce upon the sheep. At the sight of this dreadful creature, the sheep were all terror-stricken. How many creatures were there now? The dogs began to bark fiercely, pounced upon the wolf and drove it out. They chased the wolf for a few minutes, caught and tore it to pieces. Meanwhile the terror-stricken sheep and lambs huddled themselves in a corner of the yard. How many animals now remained in the yard? The dogs after finishing the wolf came back and quietly slept in their kennels."

The incidents of the story may also be represented in action. A few children will stand forming the sides of a rectangle; this will represent the farm-yard; others pretending to be sheep will enter the yard in fours, while others pretending to be lambs will enter the yard bleating. Then two big boys will enter the yard barking like dogs and lastly another big boy will enter the yard lolling his tongue and howling like a wolf. The sheep and lambs will look terror-stricken and the two big boys will then drive the wolf out.

Number lessons conducted in this manner cannot but be interesting to children. When children go to the garden they may be asked to count the number of flowers or fruits on a stem and when a few are plucked they may be asked to count the remainder. At this stage children need not learn to write the symbols of numbers;

it is enough if they learn to construct the form of these symbols in their games with sticks and rings, threads, etc.

In teaching form, colour and number to little children, if teachers follow the Kindergarten methods briefly outlined here, the difficulty of their task will be materially diminished.

# LECTURE X.

LANGUAGE WORK.—CONVERSATIONAL LESSONS, THEIR NATURE AND PROPER PLACE IN A TIME-TABLE AND IN THE TEACHER'S THOUGHTS.

READING AND WRITING, THEIR PLACE IN THE CURRICULUM OF A SCHOOL.

Language is the means most commonly employed to give expression to our ideas. Knowledge about things which are too distant to come under the operation of our senses, can only be got by the medium of language. But till now it was thought that language was the only means of expressing our inner-self and obtaining information about the external world. But it must be understood that language is not a very direct means of expressing our ideas and in the case of children it is by no means a suitable form of expression. In their case, language is a more difficult form of expression than drawing. Words are artificial symbols and children when they begin to speak have to learn the meaning and use of these symbols. In the begininng this task requires a great deal of effort. When children begin to write they have to learn the use of another kind of artificial symbols, namely, letters. When a child writes out his ideas, he is using the symbol of a symbol. Hence the teaching of the alphabet is always a very difficult part of the teacher's work. But the relation between the function and structure of plants and animals; the beauty of form observable in their structure, the glory of God as seen in nature,—these and such other facts can only be properly described by the use of language. Hence there can be no two opinions about language-lessons forming part of the Infant School curriculum. Froebel thinks that children should not be introduced to reading and writing before the age of seven. To begin with dead symbols before the child enjoys the life around it is to crush the life out of the child. Hence children should not be taught reading and writing before they are well acquainted with the things of nature and with her work which forms the basis for future progress. Equipped with this knowledge, they go out into the world prepared to learn things in an intelligent manner. But it is as bad to keep children back as to push them too quickly. We should therefore strike the happy medium. Perhaps we may begin reading and writing with children when they are between five and six. At this stage reading and writing should be taught to them in the form of play and should be connected with such school-work as is most interesting to them, such as the school garden, nature-study, etc. Words connected with the school garden or the central lesson of the school should be written by the teacher in big type on the black-board and the children should read these words with the help of the teacher. In the beginning only single words should be taught and a short conversation should accompany a word-lesson. At this stage children need not write these words but need only construct the form of the letters by means of such kindergarten occupations as stick and ring laying, thread-laying, embroidering, etc., and writing may be introduced when the children become well acquainted with the form of the letters. To give more interest to these lessons, games with music may also be introduced. The children may be made to stand in the form of the letters and sing something in connection with the word represented by the letters. When the letters of the alphabet have been taught in this manner, combinations of these letters with vowels or consonants may also be taught. Words connected with the central lesson of the school should form the basis of these lessons at this stage also. Moreover children may now be asked to write the words they learn.

The next stage in the teaching of reading is to make the children read sentences about what they learn in the nature-lesson. The sentences should be formed with the help of the children and should be written by the teacher on the black-board. The language of the sentences should be such as is suitable to little children. For example, when describing the sunflower plant, it is advisable to give the description as if the plant were speaking. The description may, for instance, be in the following manner :—" From the little seed you put into the ground, see ! I have grown into a plant taller than yourself. I raise up my arms just as you raise up yours, only my arms are broader and thinner than yours. I use my hands to get my food just as you use yours for the same purpose. For your pleasure, I bear broad, round, golden flowers. Just like you, I too like to play in the sun, and I am as fond of the sun as you are." Such a passage is not only interesting to little children but gives much room for the exercise of their imagination. After the lesson is over, these sentences should be copied by children in their note-books. By the side of this description, the children should be encouraged to make suitable drawings expressive of their ideas. In this way they can make their reading books for themselves.

By thus connecting reading and writing with the nature-lesson, the facts learnt in the nature-lesson are well impressed and children acquire facility to express their ideas by means of language. At this stage effort should also be directed towards making their writing neat, legible and rapid.

When children are reading sentences about the observations made during the nature-lesson, they should also be made to recite poems written by famous authors and connected with the central lesson of the school. Such poems give life to the reading lesson.

In the higher classes it may not be possible to fully correlate the reading lesson to the nature-study lesson of the class; neither is such a step advisable. In these classes the purpose of the reading lesson is twofold:—(1) The reading lesson aims at giving the child information about objects too distant to come under the operation of his senses and to supplement the information he has already acquired about objects that have come under his observation.

(2) The reading lesson aims at introducing the child to works which give him an idea of the beauty of literature and which conduce to his moral elevation.

Biographies, books on history and travel satisfy the first aim, while the great epics—the Ramayana and the Mahabharata—satisfy the second aim.

Neither is it possible to fully correlate the writing lesson to the nature-study lesson at this stage. Now the writing lesson not only aims at neatness, legibility and rapidity but also aims at the harmonious blending of the several parts of a sentence, in fact, the writing lesson now becomes an exercise in composition. At this stage, we shall have to see not merely whether the boy has expressed his ideas correctly but whether he has expressed those ideas in correct language and whether there is choice of expression in his composition. Whenever possible, drawing, clay-modelling, brush-work and other manual occupations should at this stage be correlated to the reading lesson.

### CONVERSATION-LESSONS.

Conversation-lessons, as their name implies, begin with a little chat with the children. The main purpose of such lessons is to familiarise the children with the things and events around them. Thus the weather may be the subject of conversation on a certain day, while a familiar object such as the clock may be the subject of conversation on another day. Though the imparting of useful information is the main object of conversation-lessons, yet these lessons give much help to the teacher in familiarising the children with the various forms of expression. Such a purpose can only be achieved not by the teacher doing all the talking, but by drawing the children into conversation on the subject of the day. Just as in other lessons, there should be a definite plan in these lessons and the teacher should carefully prepare for the lesson beforehand. During the progress of the lesson, the teacher should carefully follow the trend of children's thought and lead them to his aim. Objects, models, sand-trays, good pictures, important natural phenomena, important industries in the district, important structures under construction —these are some of the things that may be made the subject of conversation-lessons. When objects are selected to converse upon the teacher should not confine himself merely to an enumeration of their uses and qualities. In conversation-lessons we appeal more to the imagination of the children than to their power of careful observation. When talking about the cow, we do not ask them as to the number of her eyes but as to why she licks her calf. If pictures become subjects of conversation-lessons, it is desirable that they are child-like, for it is then that they appeal most to children even if they are foreign. The pictures for conversation-lessons should suggest some good story, and should invariably be related to the central thought of the school. They should not be chimerical but should contain some human interest. Above all, they should be pretty. The children should be made to reflect on the pictures and say something about what they see. This lesson should invariably be related to other parts of school work such as drawing, games, etc.

# LECTURE XI.

OCCUPATIONS SUITABLE FOR THE YOUNGEST CHILDREN—FOR THE OLDER CHILDREN OF INFANT, PRIMARY AND OTHER CLASSES. FROEBEL OFTEN MISREPRESENTED IN THIS MATTER.

There are differences between younger children and older children both in physical and mental characteristics.

The growth of the brain is very rapid during the first seven years of a child's life, its weight being about 40 ounces at the age of seven. During the subsequent five years the growth is only about five ounces and the maximum weight (47 to 50 oz.) is reached only in the twentieth year. The bones during infancy are soft and pliable and their number is about 200. As the child grows older their numbers decrease and they get harder. Thus the physical side of a child under seven presents a strong contrast to that of an older child.

As for the mental characteristics of little children. How is it that educators find it more difficult to teach younger children than older ones? Little children are weak in reasoning power and are very inattentive. Unlike the older ones they are anxious to know more and more of the world around them. They are in fair command of limbs and language and they very much want to exercise these. They are intensely active and fond of being occupied. Little children want work and direction. In them imagination is very strong. Froebel looked upon them as those who feel and do. They are fond of doing work in the real world and in the world of imagination. The difficulty is to find the right kind of work for these. Froebel in his Kindergarten solved this difficulty. Though in little children there is no intense craving for happiness or pleasure yet it is quite necessary for them. It is not enough to remove them from positive misery. Hence one of the main aims of the Kindergarten is to increase the happiness of little children. Children are born to enjoy the world around them.

The aim of infant education :—

Adverse criticism has been levelled at making happiness the sole end and aim in Kindergarten. Other schools dissent from this view. No doubt each school has something to say for and against it. But the balance of opinion favours the view of holding happiness as the ideal of education. The great Creator could not have created this world so beautiful if he did not intend it for the enjoyment of created beings. On what does this happiness depend? It depends upon employment, freedom, *i.e.*, liberty—not license—obedience, understanding and appreciating what is beautiful and fine in nature and on contributing to the weal of others. Give children as much freedom as possible but never for a moment allow license. Help children to get power from within. Do not allow corporal punishment, for if you do, you will be showing your own weakness. Get rid of that military discipline which consists in making every child do the same thing at the same time. Strike a happy medium between military discipline on the one hand and license on the other. Make a child obedient rather from liking than from force. Foster affection.

There is a great divergence between the mental characteristics of older and younger children. The grown-up child has more strength of will and the range of his worldly knowledge is wider. The games and songs which readily appeal to tender brains may not have a like charm on him. The little child is satisfied with simple songs and games which do not call forth much concentration of mind. But the older children are capable of more prolonged attention and longer endurance. Hence very simple games will not satisfy them. Unlike the younger ones, the power of observation is great in older ones. They are more social and fond of preserving things done by them safer and more carefully. They are also fonder of realities than the younger ones. Hence it is not appropriate to commingle both the grown-up and the tiny bairns together.

### Occupations for children between three and five.

Games with songs, short verses for recitation, picture lessons, laying coloured tablets in different designs, drawing on black-board and sand, selecting an object of a particular tint from a heap containing objects of various colours, embroidering with large needles, threading beads in twos and threes, laying various figures with sticks and rings, building with gifts III and IV.

### Occupations for children from five to seven.

Brush-work, pencil drawing, gardening, descriptive stories, stories on history and travel, writing, drill, more difficult games, moulding with soft clay or plaster, cane-weaving, measuring length, weighing, ball games; paper plaiting, folding and cutting.

### OCCUPATIONS FOR CHILDREN OF SEVEN AND EIGHT.

Gifts V and VI, brush-work, modelling, weaving, basket-making card-board work, gardening, drill, organized play. In the case of these children gardening should mainly aim at creating love for nature. In all these occupations let there be some definite purpose useful either for school or home.

### OCCUPATIONS FOR STILL OLDER CHILDREN.

These children may have modelling, weaving in looms, basket-making, matting, brush-work, drawing, simple course of sloyd and gardening—each one of these occupations should serve some educational purpose. Never make a fancy thing in school. In the case of these children, gardening should lay a strong foundation for the study of Botany, Geology, Zoology and such other natural sciences.

# LECTURE XII.

## MANIPULATION OF THE FOLLOWING MATERIALS WITH NOTES ON THE SAME :—GIFTS 1, 2, 3, 4, 5, 6.—BEAD AND OTHER THREADING, FRAYING, SAND-WORK, STICK AND RING LAYING, PAPER FOLDING, DRAWING, MODELLING AND BRUSH-WORK.

A survey of the materials :—

The gifts and occupations were intended by Froebel to satisfy the instinctive activities of children. He saw that they liked to play in mud and sand and that they liked to pull things to pieces. He thought that harm was done by not satisfying these instincts. Hence, he took such things as he saw appealed to all children and systematised them for educational purposes. This is Froebel's great task—the providing of suitable material for the work of little children. The difference between the so-called gifts and occupations is that in the case of the gift, the material is not permanently changed while the children play with it, while in the case of the occupations the material is permanently changed.

### GIFT I.

*I. Material.*—

This gift consists of a box containing balls of worsted of six different colours—red, yellow, blue, orange, green and violet. In the box there are three sticks which can be used as a framework to hang the balls from and there are also strings required for this purpose. (Fig 1.)

The reasons for the choice of the ball as the first educational toy to be given to the child are :—

(i) Children are familiar with the ball from their infancy.

(ii) The ball suggests movement.

(iii) It is one of the simplest of forms.

(iv) It can readily be used to symbolise other objects and thus satisfy the child's imagination.

(v) It is a safe plaything.

Ball games were a favourite amusement in Greece and Rome in ancient times.

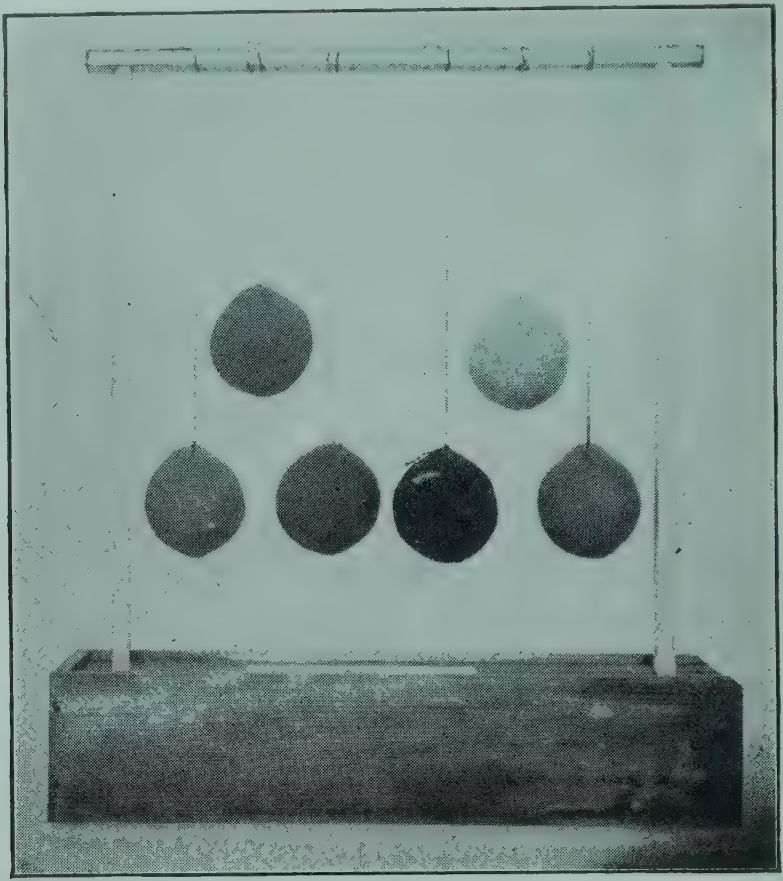

Fig. 1.—Gift I.

*II. Educational value.*—

The children while playing with the ball unconsciously learn (1) Colour, (2) Hardness, softness, (3) Movement, (4) Rhythm, (5) Position, (6) Direction and (7) Representative ideas (cradle, basket, bird's nest, etc.).

*III. Preparation by teacher.*—

The teacher must previously study what play he is going to have and prepare for it.

*IV. Exercises.*—

(*a*) Exercises with the ball without the string :—

(i) Rocking the baby in the cradle :—

"Our baby dear,
Is lying here,
Within her cot-asleep ;
And while I rock her to and fro,
A loving watch I keep."

(ii) Grinding corn:—

“ Let our hands the mill-stones be,
Grind the corn for you and me,
Grind it quickly and grind it small,
Now we will rest our little ball.”

(iii) The ball as a bird:—

“ A little cage let this be,
A pretty bird in it I see.”

(*b*) Exercises with the ball on the string:—

Drawing water from the well:—

“ See my pretty little bucket,
Down the well it goes,
Up again it comes,
With water for you and me.”

## Gift II.

*I. Material.*—

It is a box containing a sphere, a cylinder and a cube, all made of wood. There is another cube which has some of the corners cut off and holes pierced through the whole cube so that sticks or strings can be passed through for any little game. There are

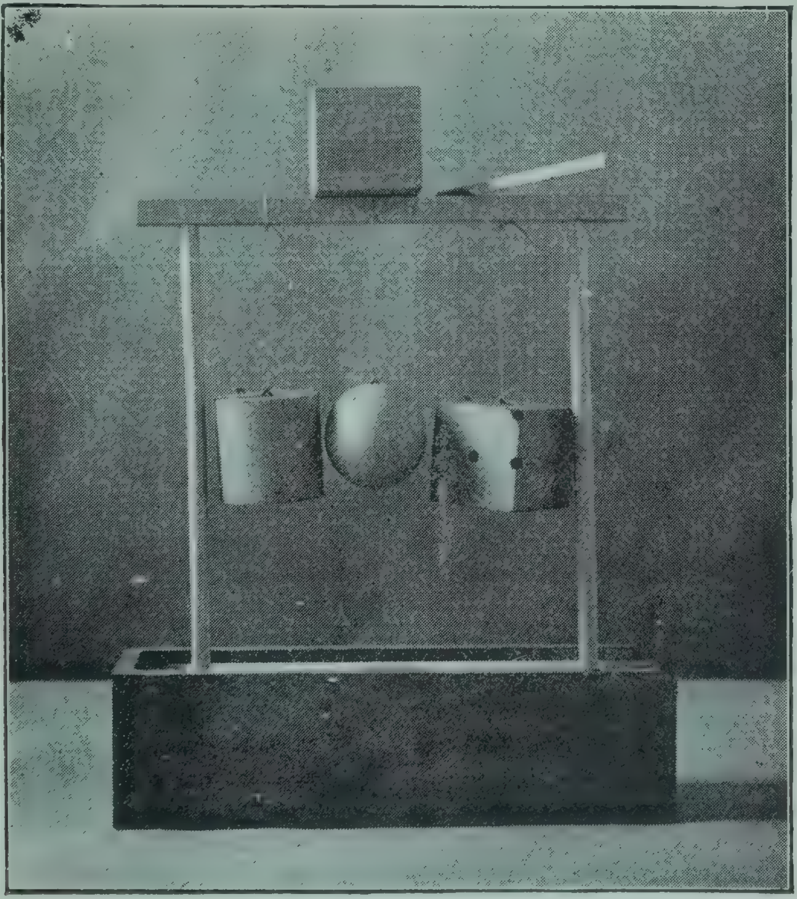

Fig. 2.—Gift II.

three sticks which serve a similar purpose as those of Gift I and there are also strings to hang the pieces from (Fig. 2).

*II. Educational value.*—

As the child has gained some strength, a harder material is put into his hand. He can, by means of this gift, get further ideas of form, sound, touch, weight and number.

The law of complements with their intermediate form is well exemplified in this gift, the cube being the direct complement of the ball and the cylinder being intermediate in form between the cube and the ball.

*III Exercises.*—

(*a*) Exercises with the ball.

  (i) Rocking the baby in the cradle as in Gift I,
  (ii) Grinding corn,
  (iii) Bird-game,
  (iv) Drawing water,
  (v) Clock-play (game of the pendulum).

(*b*) Exercises with the cylinder.

The cylinder may be made to represent a flower-pot, a garden roller, a little bucket, etc., and rhymes may be taught in connection with such plays.

This gift is very useful in giving lessons on form to older children.

### Gift III.

*I. Material.*—

Froebel saw that children liked to investigate their toys and when they had broken their toys with this view, they were disappointed in not being able to restore them to their original form. Hence, he gave the children, in his building boxes, a toy which they could take apart and afterwards restore to the original form. He also saw that they liked to pile up stones and bricks and build something from them. To satisfy this desire he devised his building boxes. The simple material of this gift gives much room for the exercise of imagination whereas a highly finished model such as a perfected doll does not give much room for it. When a child makes a hole in his drum he cannot mend it, but there is no such difficulty in his gift.

The third gift consists of a box with a cube in it. This cube is divided in the middle once in each of its dimensions; hence, it is divided into eight smaller cubes.

*II. Educational value.*—

By means of this gift we can give the children ideas of:—(1) a whole and its parts, (2) the relation of the part to the whole, (3) number and (4) the alteration of form without destruction of material. We can also improve their sense of touch and their skill in handling the material.

*III. Exercises.*—

Grouping of exercises:—

(i) Opening the box simultaneously in the proper manner.
(ii) Building familiar objects.
(iii) Exercises in number.
(iv) Symmetrical forms.

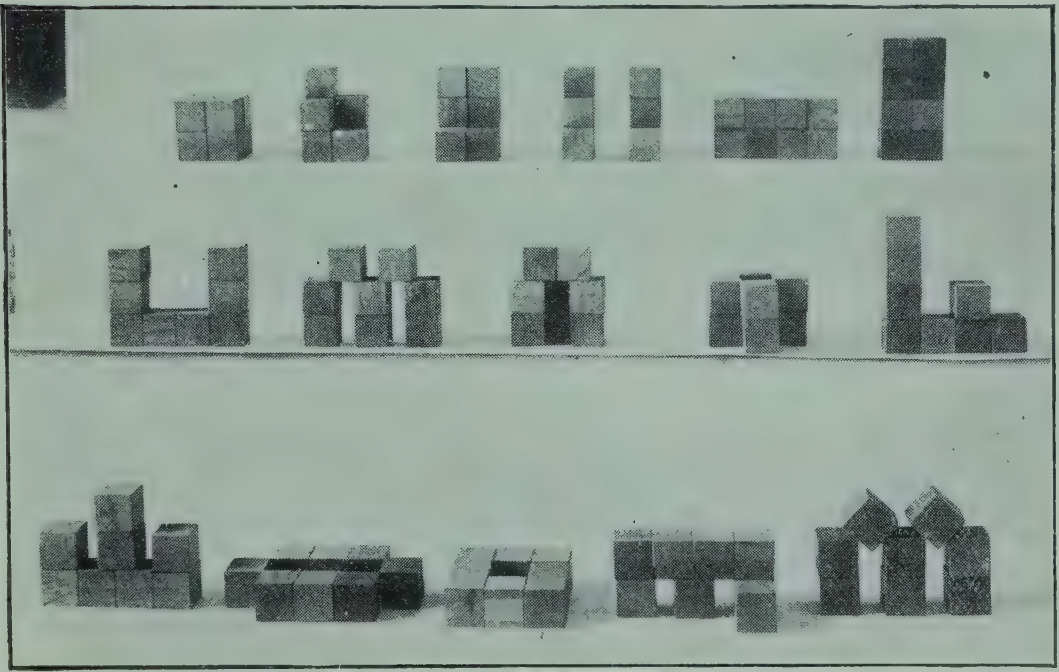

FIG. 3.—SPECIMEN CONSTRUCTIONS WITH GIFT III.

### RULES FOR BUILDING.

In building exercises, we must use all the pieces of the gift and one object must be developed from another, *e.g.*, the cube, a pot-stand, a high-backed chair, etc. We must correlate these exercises to nature-teaching or story-telling. By means of paper dolls, etc., we can make our buildings prettier, give life-interest to the children, and thus exercise their imagination.

Examples of series of constructions in Gift III.

First series:—

(1) The cube, (2) a high-backed chair, (3) two small chairs, (4) a wall, (5) a high wall and (6) the cube again. (Fig. 3. Nos. 1, 3, 4, 5, 6.)

Second series:—

(1) The cube, (2) the sentry box, (3) a deep well, (4) a gate-way, (5) another gate-way and (6) the cube again. (Fig. 3., Nos. 1, 9, 10, 8, 16.)

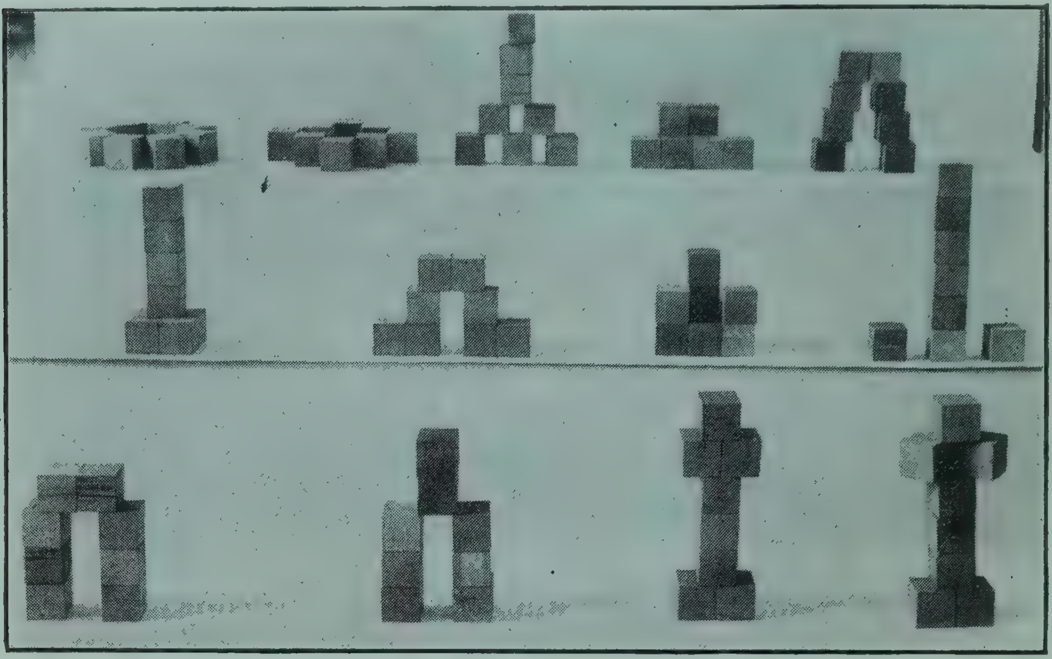

FIG. 4.—SPECIMEN CONSTRUCTIONS WITH GIFT III.

## GIFT IV.

*I. Material.*—

As in the box of the previous gift, the box of this gift contains a cube. Here also the pieces are the same in number, namely, eight. Hence, the volume of the pieces must be the same though the form is different. There we had eight cubes with equal dimensions, but here we have oblongs with different dimensions. Here the length is double the breadth and the breadth is double the thickness.

*II. Educational value.*—

(i) Children learn the meaning of length, breadth and height.

(ii) The equality of the volume of the cube and the oblong may be shown by cutting the oblong in the middle and superimposing one square over the other.

*III. Exercises.*—

As the pieces of this gift resemble the bricks used in house-building, many more familiar forms can be constructed from the pieces of this gift than from those of the previous gift. Here also we can make series of constructions as in Gift III. Some of the object forms that can be constructed with this gift are shown in Figs. 5 and 6.

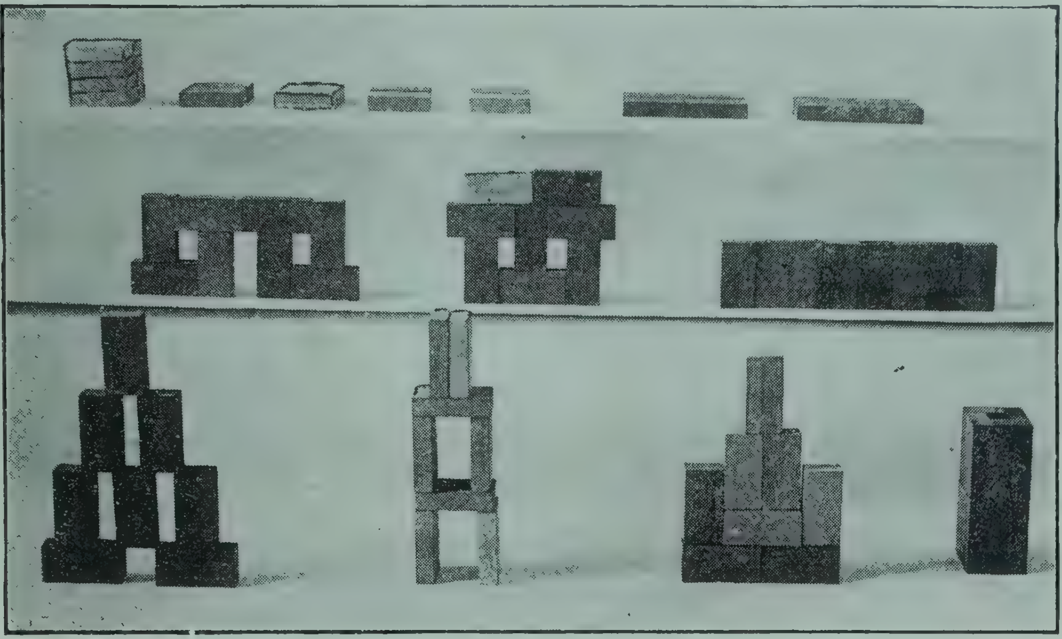

FIG. 5.—SPECIMEN CONSTRUCTIONS WITH GIFT IV.

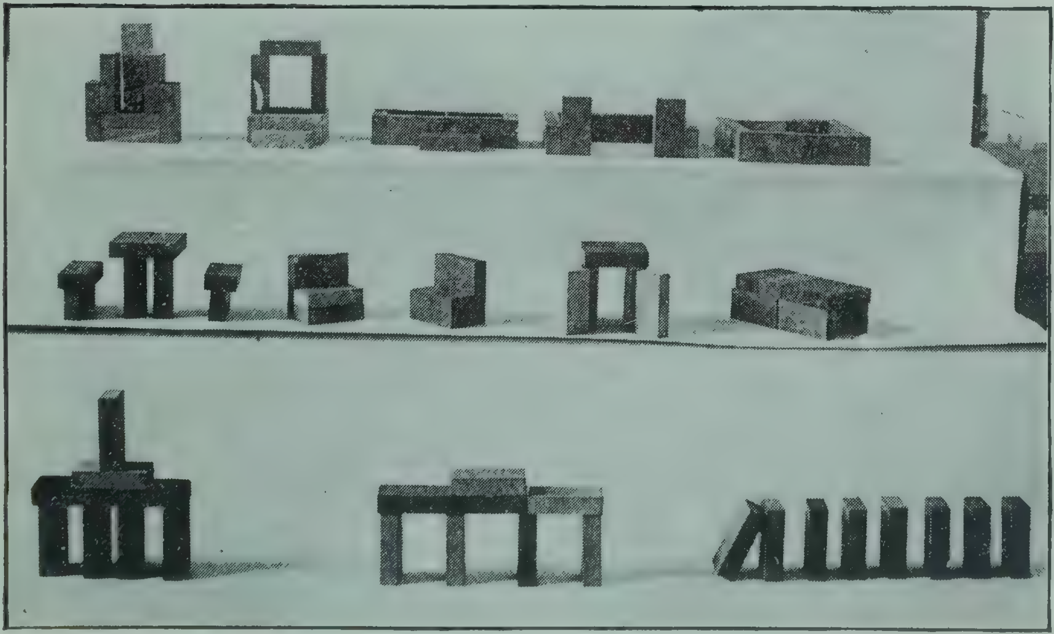

FIG. 6.—SPECIMEN CONSTRUCTIONS WITH GIFT IV.

## Gift V.

*I. Material.*—

This gift is a development of the third gift. In the third gift the cube is cut once in the middle in each dimension; here it is cut twice in each dimension. Hence there are 27 cubes in this gift. For greater variety of form some of the cubes are cut across the diagonals. Three are cut across one diagonal so as to make halves, and three across both the diagonals so as to make quarters. Hence in this gift there are altogether 39 pieces.

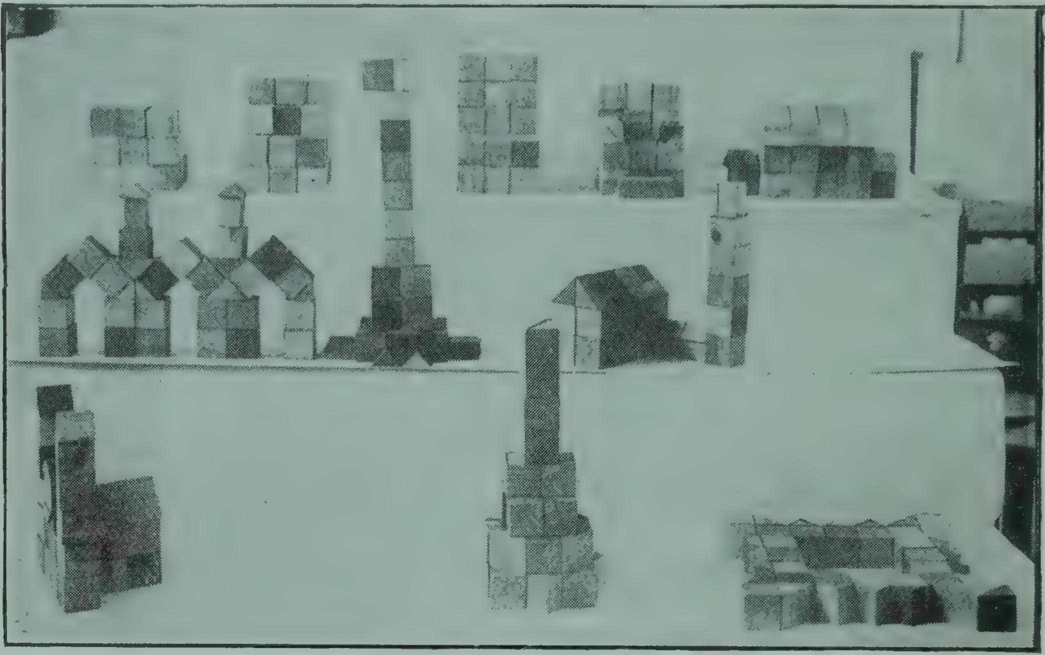

Fig. 7.—Specimen constructions with Gift V.

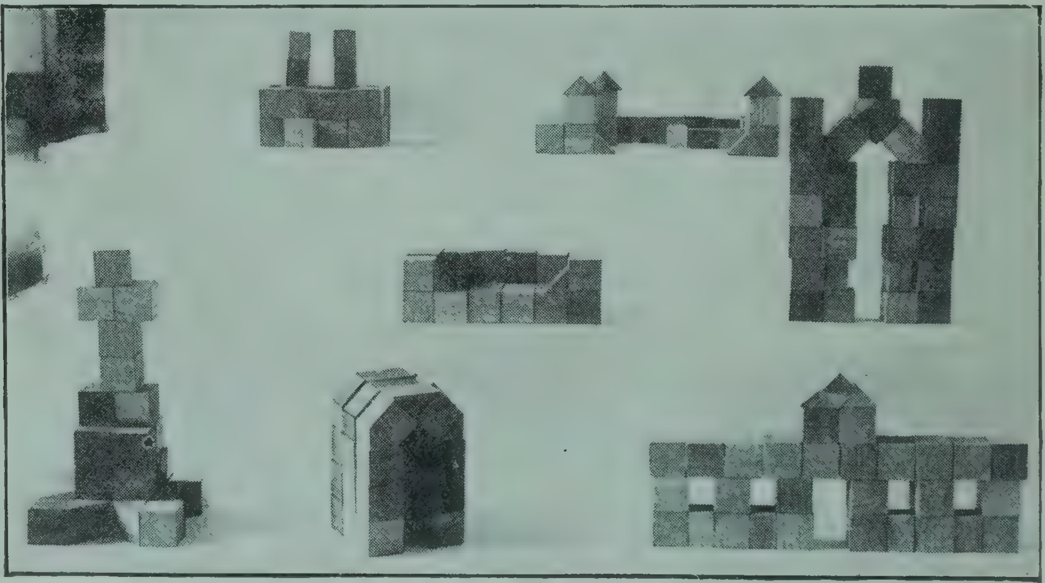

Fig. 8.—Specimen constructions with Gift V.

*II. Educational value.—*

(i) From this gift the children can learn the meanings of the fractions—quarter, half and three-fourths.

(ii) They can also learn that $3 \times 3 = 9$ and $9 \times 3 = 27$.

(iii) From the previous gifts the children are familiar with the forms of the sphere, the cube, the cylinder, the square and the oblong. This gift will give them an idea of the triangle and the prism.

*III. Exercises.—*

Greater variety of construction is possible with the pieces of this gift than was possible with the pieces of Gift III. Figures 7 and 8 show some of the object forms that can be constructed with the pieces of this gift.

## Gift VI.

*I. Material.—*

As the fifth gift is a development of the third gift, the sixth gift is a development of the fourth gift. In this gift there are 27 oblongs similar to those of Gift IV. But six of these are cut breadthwise so as to give twelve square pieces and three are cut lengthwise in the middle so as to give six pillars; altogether there are 36 pieces.

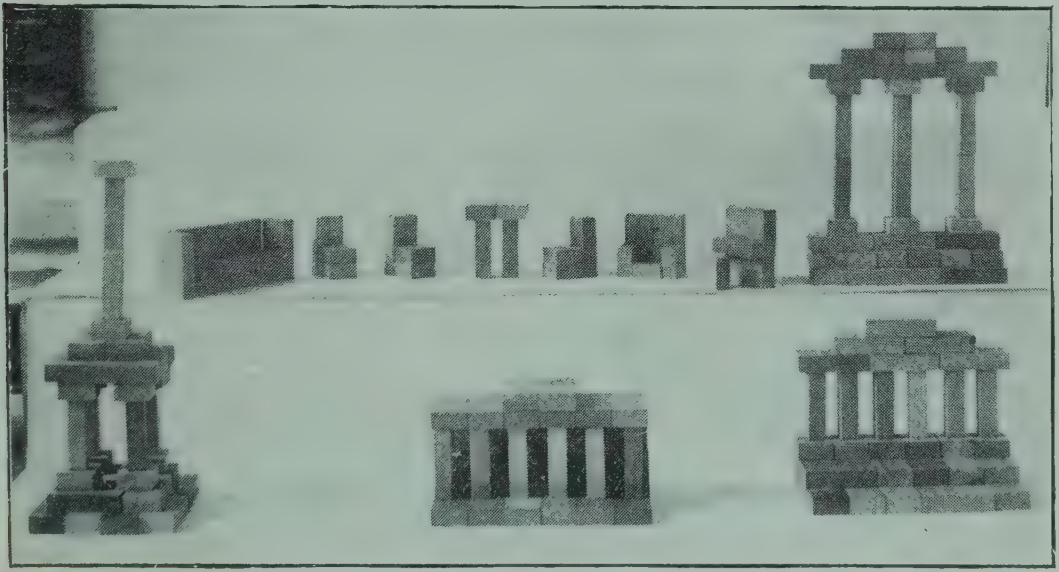

Fig. 9.—Specimen constructions with Gift VI.

*II. Educational value.—*

(i) This gift is very useful for teaching children equality of volume in diversity of form.

(ii) There is great scope for the development of the idea of form.

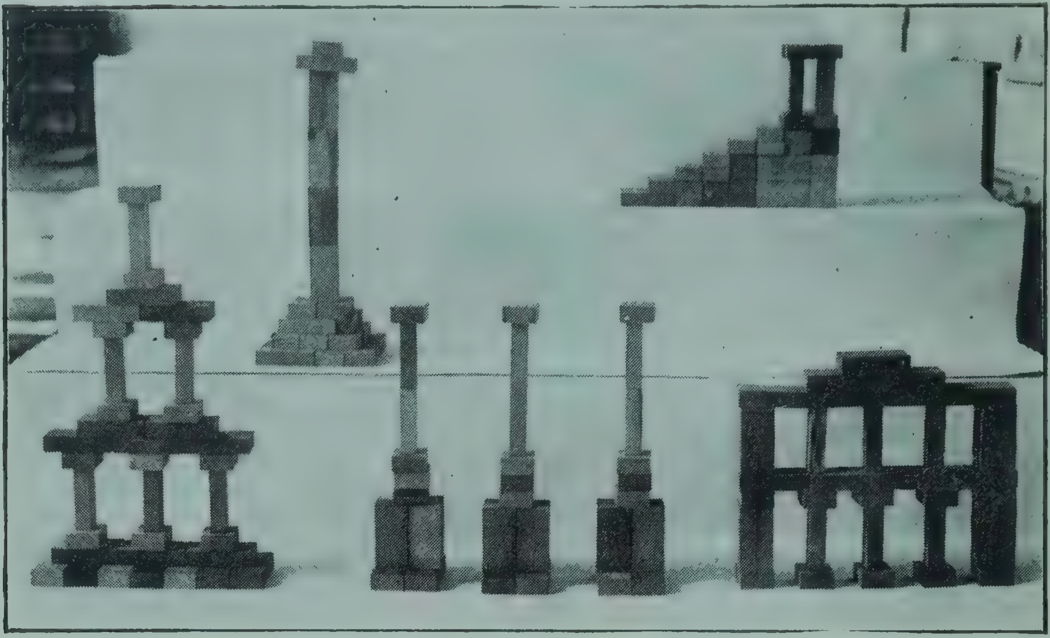

Fig. 10.—Specimen constructions with Gift VI.

*III. Exercises.*—

As the pieces of this gift resemble the pillars, bricks, etc., of the buildings which children see around them, it is possible to construct many more familiar forms with this gift than was possible with the previous gifts. Figures 9, 10 and 11 show the object forms that can be constructed from the sixth gift.

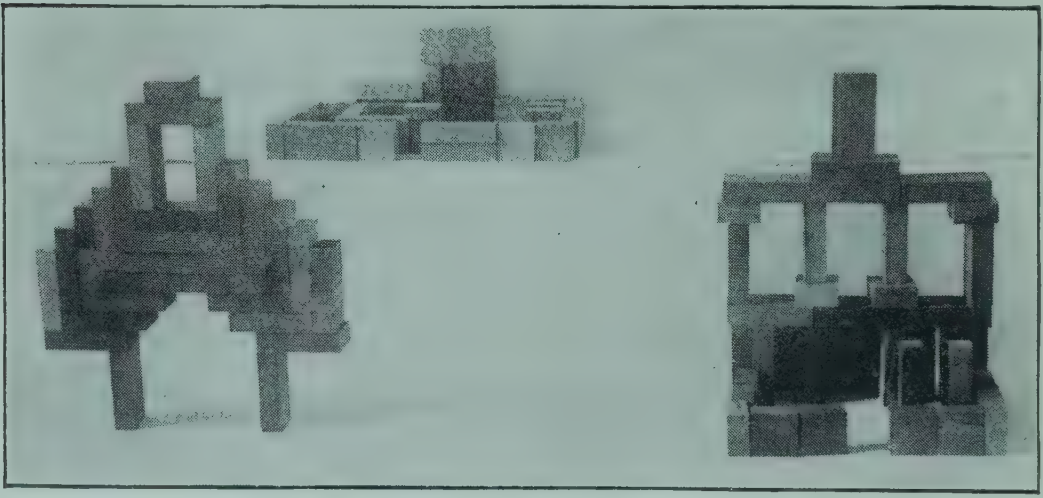

Fig. 11.—Specimen constructions with Gift VI.

## BEAD-THREADING.

*I. Material.—*

Bead-threading is a natural occupation with children. For this work we require large beads of different colours, threads of equal length with a bead tied at one end, thin sticks, saucers to put the beads in and bees-wax to wax the ends of strings occasionally. Cylindrical coloured tubes are also used in combination with beads. These materials should be kept in an orderly manner.

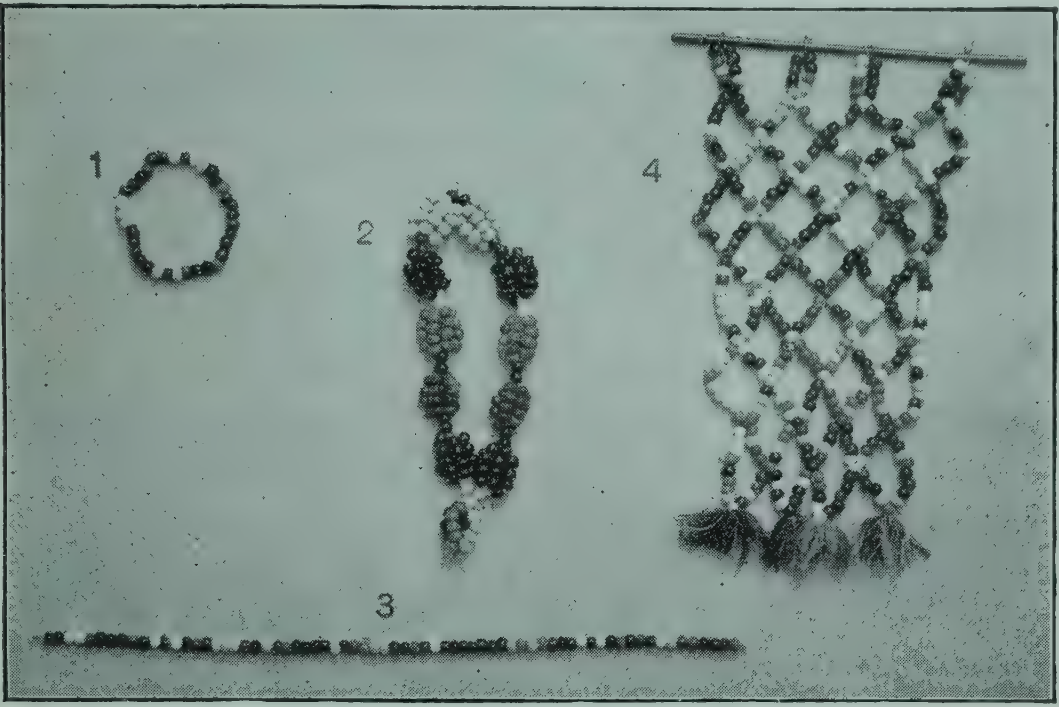

FIG. 12.—BEAD-THREADING.

*II. Educational value.—*

(i) Bead-threading primarily teaches colour and number.
(ii) Form is also learnt to a certain extent.
(iii) Harmony of colours is also learnt.
(iv) The occupation exercises skill of hand and helps to needle-threading.

*III. Exercises.—*

In all the exercises the teacher must have some purpose in view :—

(i) Threading independently of colour.
(ii) Threading beads of one colour, then of two colours, one bead of one colour, one of another, two and two, three and three, one and two and so on.
(iii) Making object forms such as necklace for the dolly, window curtain, screen, garden fence, etc.

(iv) Threading first on one wire or string, then combining two wires or strings, etc.

(v) Threading beads more than three at a time may be attempted in the higher classes.

Figure 12 shows some of the object forms that can be made with the materials of this occupation.

## Fraying.

*I. Material.*—

Pieces of bunting of which flags are made are required for this occupation. We know little children like to pull things to pieces, and we have to try to understand the meaning of this instinct and then satisfy it in a legitimate way. Fraying seems to be a destructive occupation; but we are going to construct something afresh after destruction. Sometimes we may add pieces of silk to the pieces of cloth. These pieces have to be cut beforehand to the required sizes.

*II. Educational value.*—

(i) The sense of colour, the sense of touch and skill of hand are exercised in this occupation.

(ii) From this occupation we can show children that from material which is apparently useless we can make something useful.

*III. Exercises.*—

The work with this occupation should be connected with nature-work, a picture or conversation lesson; or be made to supply some need in the school. For instance, the dolly's house may require curtains; the children can supply these with their labour. Similarly a mat may be made to put under the teacher's vase of flowers.

For very young children, we may give such exercises as stuffing a pillow, a dolly's bed, a bird's nest, a little table cloth, a cover for a little pincushion, door fringes, a mat for a flower vase, a cover for a jar, a screen, a brush, a broom, etc. They may also be asked to sort threads according to colour.

For advanced children, we may give such exercises as drawing a given number of threads from the middle of a piece of stuff, horizontally first, then vertically, then both ways, making beautiful fringes, etc, Figure 13 shows some of the things that can be made with the material of this occupation.

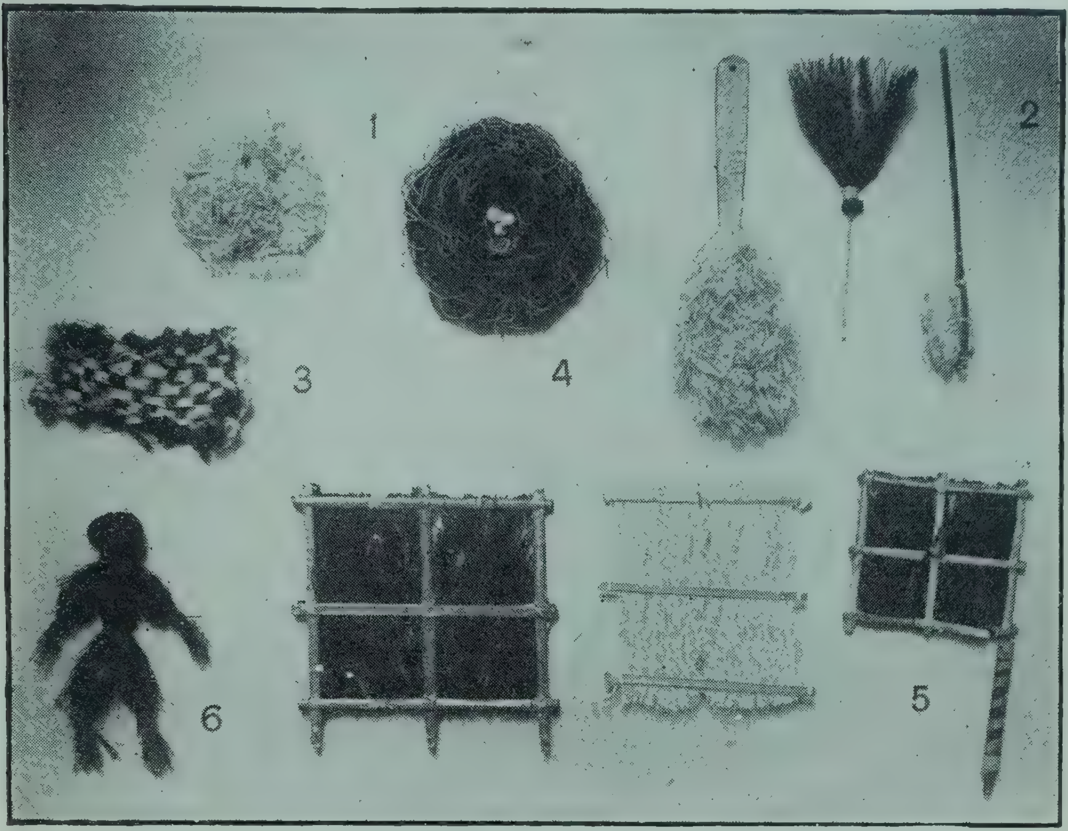

FIG. 13.—FRAYING.

### SAND-WORK.

*I. Material.*—

This is an occupation mainly for little children. Children generally love to play with sand. We are really satisfying a natural instinct when we make them play with it. For some games, the sand has to be slightly damped. Zinc trays, pails, and spades—these materials are required in this work. To create interest in the play there must also be such little additions as small branches, little sticks, beads, cowries and building blocks.

*II. Exercises*—

We can make level surfaces and trace lines so as to show the outline of object forms or various designs. We can connect this work with nature-teaching by making beds for plants. To make these beds, draw lines, put cowries round the bed, use sticks for the fences and use paper dolls to walk on paths. The paper seats and dolls required for this play may be made by the older children and used by the little ones in this play. All this is not only play but has its own educational value. Children may also be asked to do sand pies and older children may be asked to lay patterns on the sand. If, as it sometimes happens, the sand gets knocked over, we have an opportunity for a lesson on cleanliness. This play may also be used in connection with conversation-lessons.

In the higher classes sand-work may be employed in the teaching of geography. Thus the children may be asked to draw the outline of a country or to construct the model of a mountain range or a river basin. The plan of a school building and its location with respect to its surroundings may also be taught by means of sand-work.

Figure 14 shows the garden play with sand.

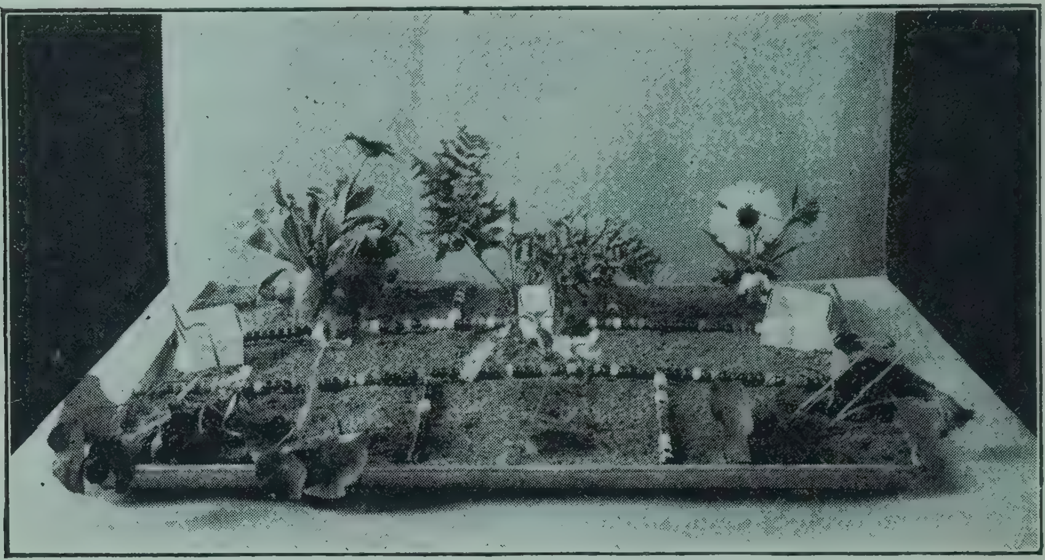

FIG. 14.—SAND-WORK.

## STICK AND RING LAYING.

*I. Material.*—

For this occupation we require sticks, 1, 2, 3, 4 and 5 inches long, rings large and small, halves, quarters, and one-eighths and ovals, large and small.

*II. Educational value.*—

(i) The outlines of solid forms are well impressed.

(ii) Ovals give the child an idea of the projection of solid-forms on plane surfaces.

(iii) This occupation greatly helps children in the expression of their inner thoughts.

*III. Exercises.*—

First, exercise the children in one kind of material only. When they get familiar with both the materials, combine them; get children to see that by combination they can produce many more familiar forms than they can with one kind of material only. Use the materials in the garden and in the class-room to show that circles when projected on plane surfaces become ovals.

Figure 15 shows the object forms that can be made from these materials.

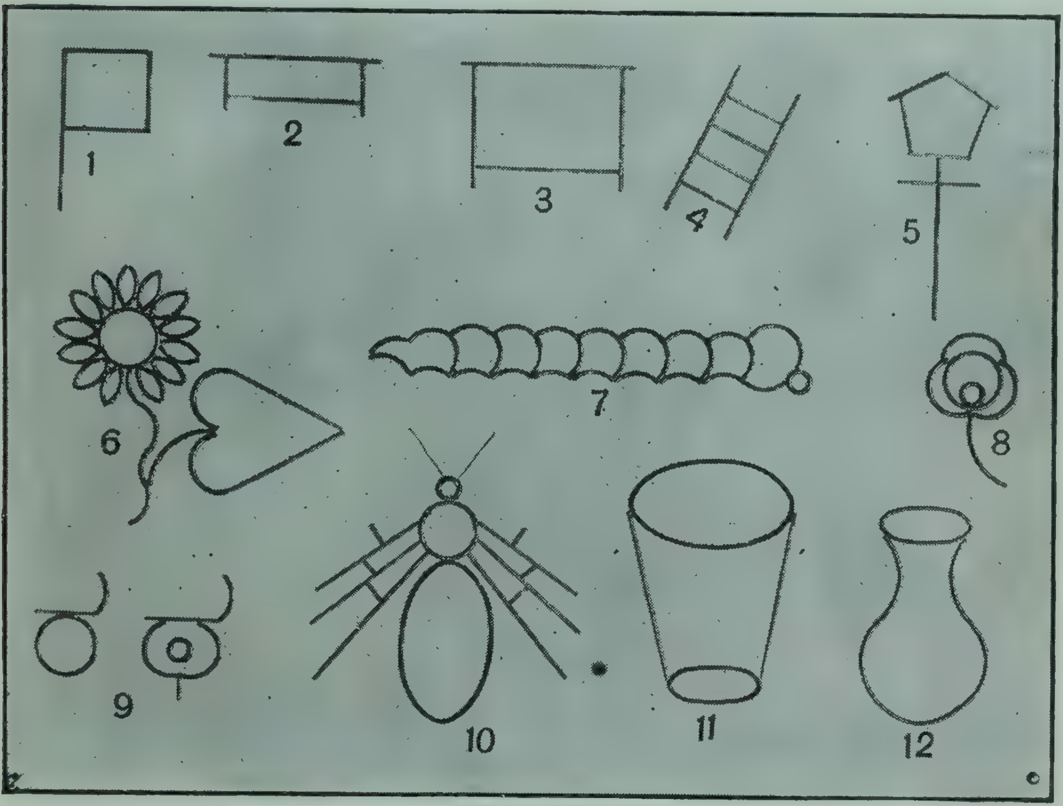

Fig. 15.—Stick and ring laying.

## Paper-folding.

*I. Material.*—

For the expression of the inner thoughts of the child, paper-folding is not so useful an occupation as drawing or clay-modelling. Still the child can, by means of this occupation, express the idea of many of the object forms he meets with in the world around him.

Paper is a material which children use very commonly and they are apt to use it in any manner they please without knowing its value. Hence, the teacher should begin this occupation by a short conversation with the children as to what people were doing when they had no paper. The rough materials which people were using for purposes of writing, such as, wooden blocks, skins, etc., may, if possible, be shown to the children during the progress of this conversation. Such a conversation will impress the children with the value of paper. By making a beautiful model from what appears to be a useless piece of paper, the children will be better impressed with the value of paper. Children who have been engaged in this occupation for some time, will not wilfully tear any piece of paper that falls into their hands. The cheapness of the material and the absence of the need of any dangerous or costly tool are great inducements in favour of a general introduction of this occupation.

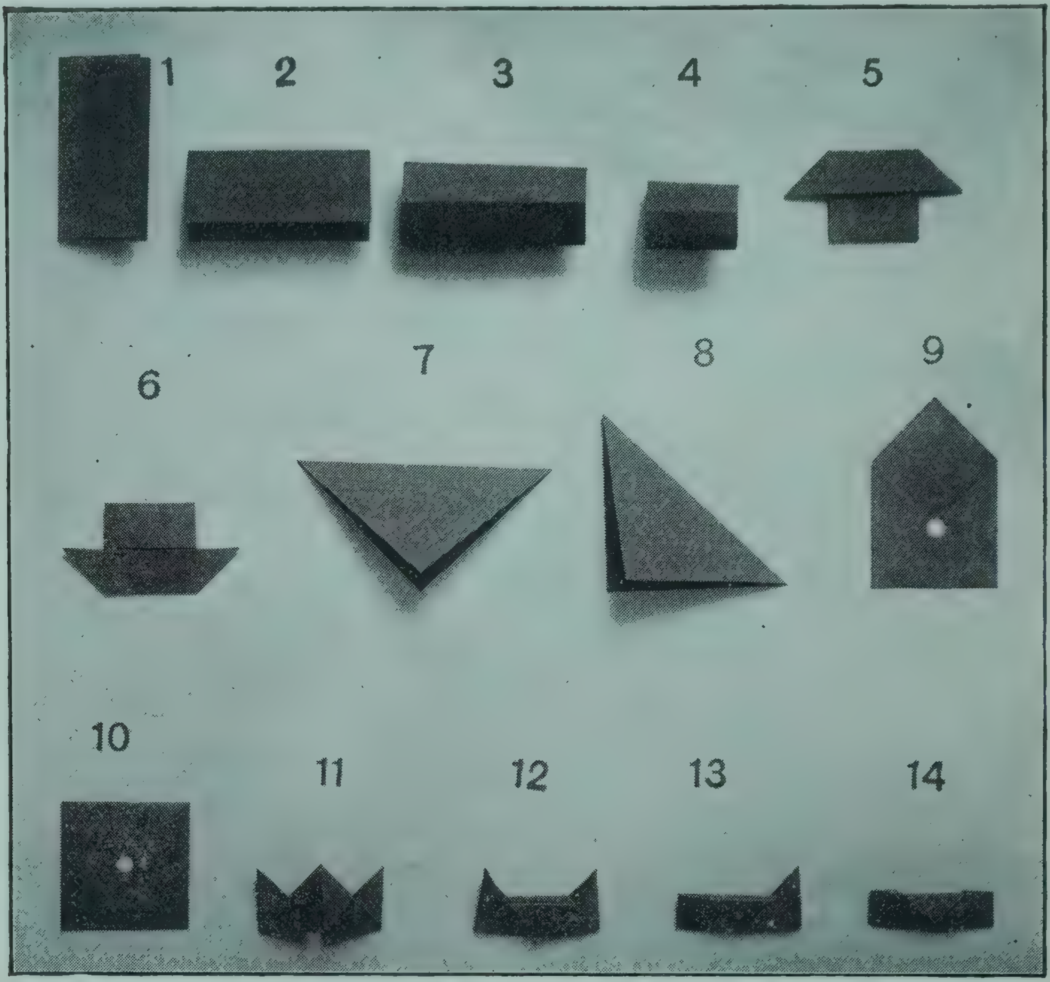

Fig. 16.—Paper-folding.

*II. Educational value.*—

(i) The eye will be trained and the skill of hand exercised.

(ii) To make a good model the children have to fold the corners and edges in an exact manner, otherwise the model will be spoiled. Hence they learn exactness in work.

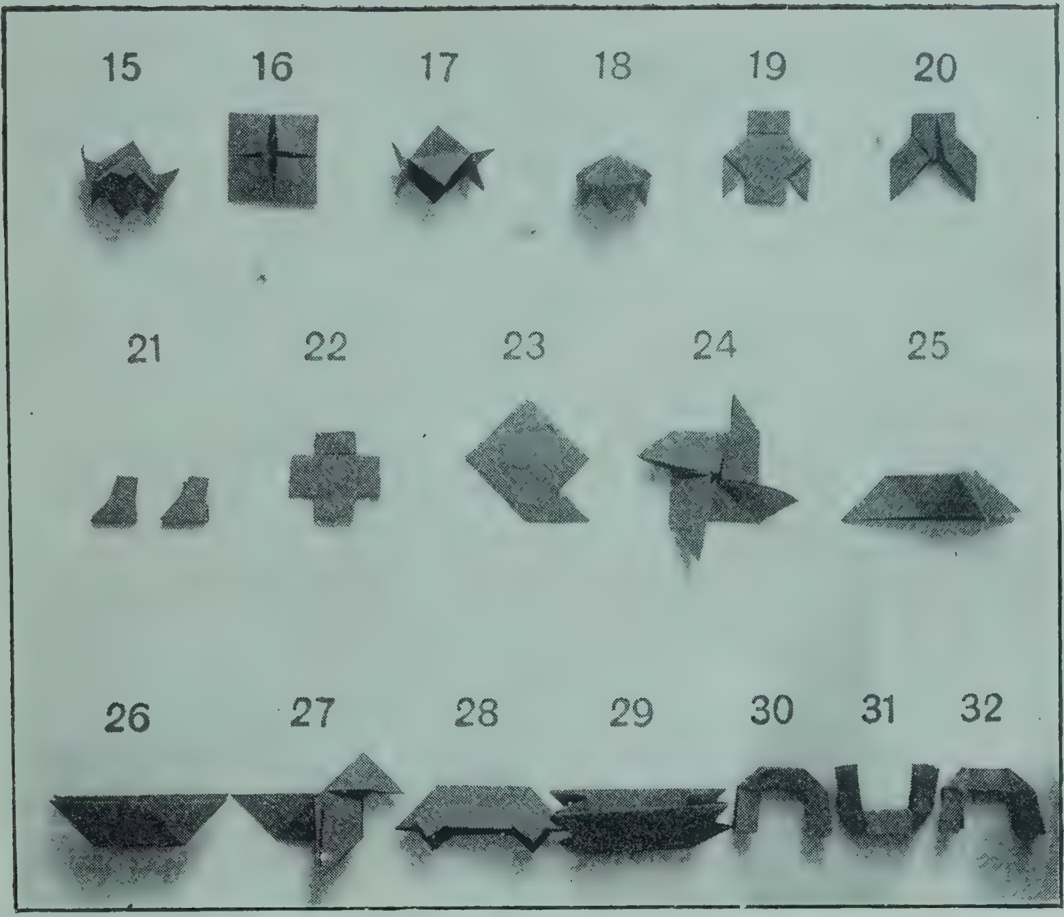

FIG. 17.—PAPER-FOLDING.

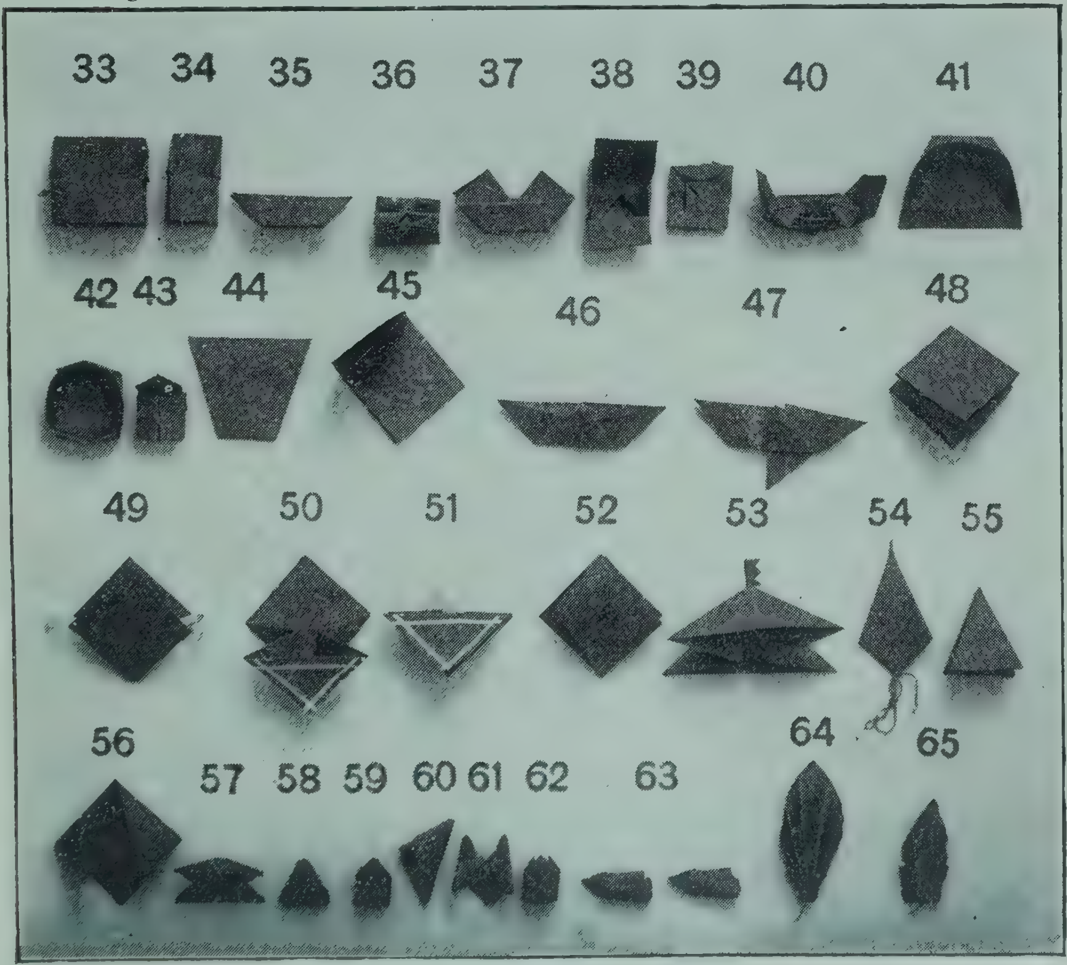

FIG. 18.—PAPER-FOLDING.

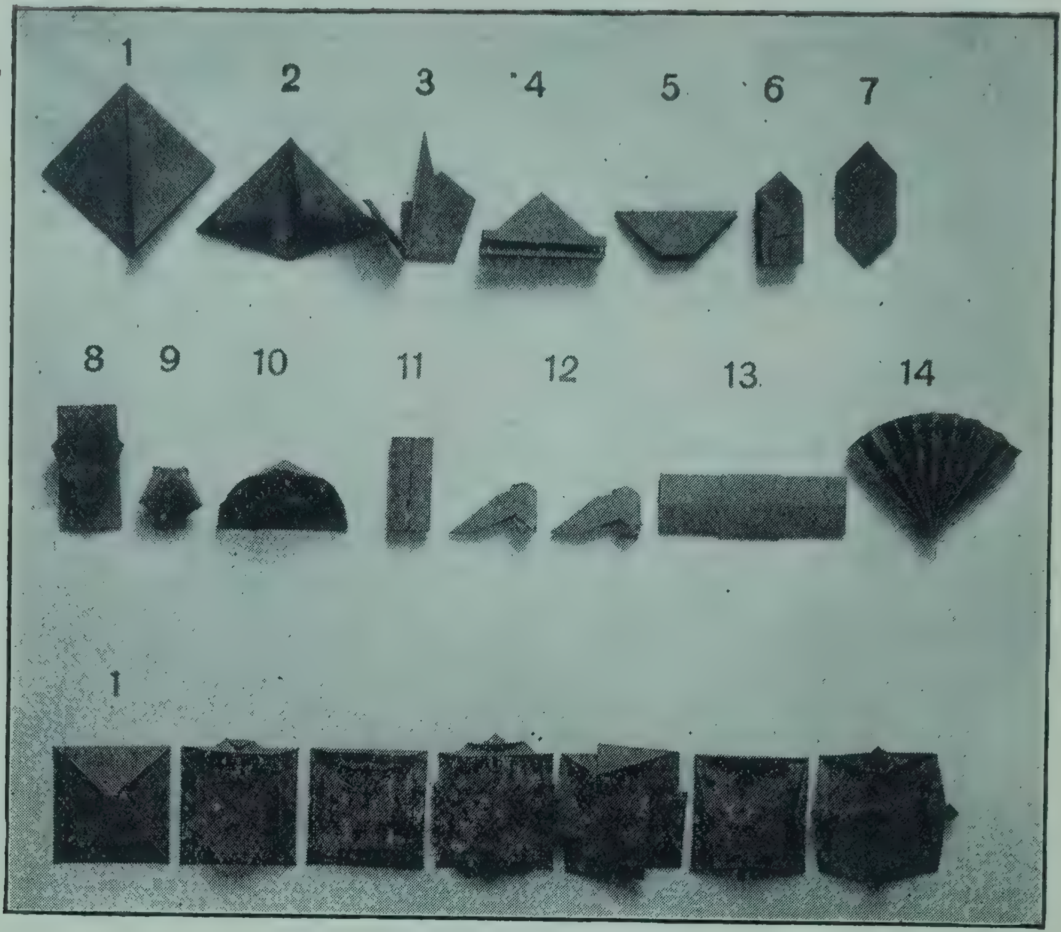

FIG. 19.—PAPER-FOLDING.

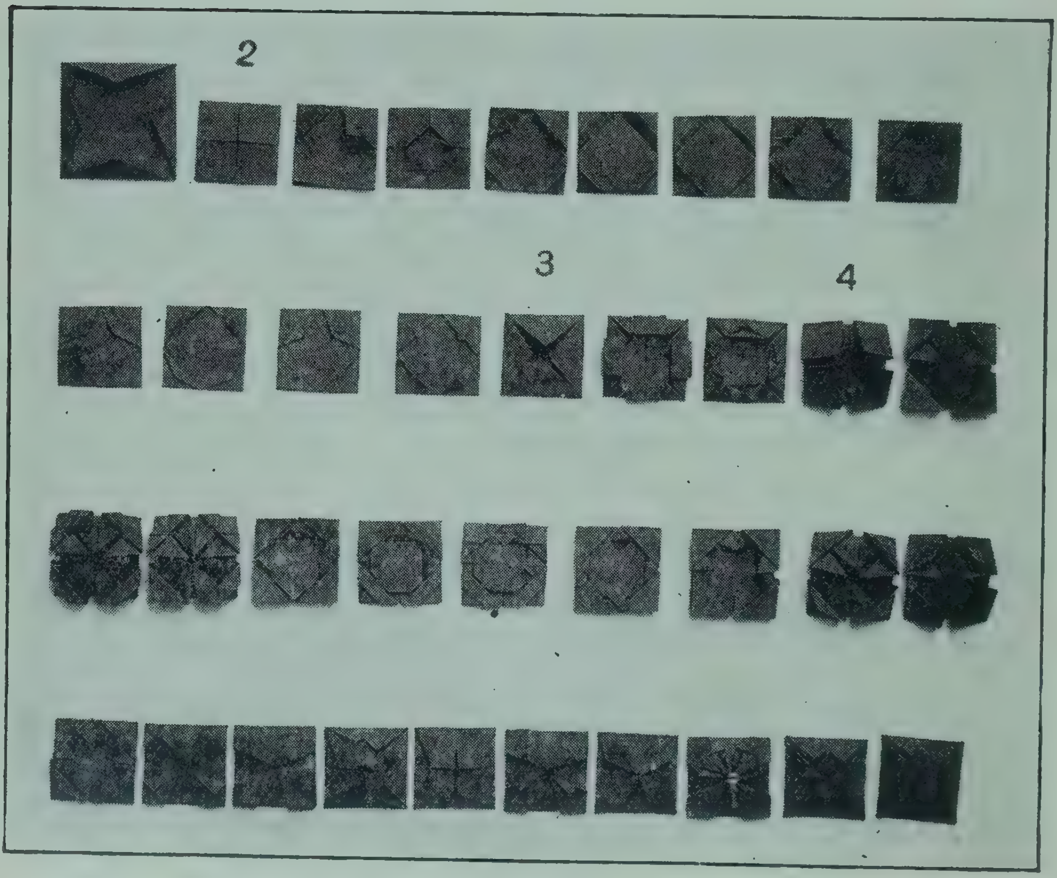

FIG. 20.—PAPER-FOLDING.

(iii) The child will feel the pleasure of having made a model with his own hand.

(iv) By encouraging children to design new models for themselves, there will be scope for the exercise of the power of invention.

(v) After making a number of models the children will learn what elements are necessary for beauty of form.

(vi) The different kinds of coloured paper used in this occupation help in giving children valuable colour-lessons.

*III. Exercises.*—

For this occupation, children use four-inch squares and oblongs 2″ by 6″, but the teacher for his work should use eight-inch squares and oblongs 3″ by 9″. The directions of the teacher should be clear and distinct, and he should see that his first direction is carried out before he proceeds to the next. Before commencing the exercises, the teacher should make the children familiar with such words as right, left, edge, corner, middle line, diagonal, etc., by the aid of the square. The children should be made to see that the paper is smooth, light, thin, and shining and state the results of their observation in the form of sentences. They should see the difference between a square and an oblong and compare these forms with windows, door-ways, etc. The exercises should, as far as possible, be progressive, subsequent exercises being based on the previous ones. As there should be co-ordination among the Kindergarten occupations, the exercises in this occupation should be related to exercises in other occupations and all should, as far as possible, be related to the nature-lesson.

Figures 16, 17 and 18 show the object forms that can be made from the square, Fig. 19 shows the object forms from the oblong and Fig. 20 shows some of the forms of beauty that can be folded from the square.

## DRAWING AND BRUSH-WORK.

We have seen that the aim of Froebel's system is to develop the natural instincts of the child as they begin to unfold themselves. One of such is the instinct to draw. The beginning of the unfolding of this instinct is seen when a child asks his mother to explain the meaning of a picture or when he begins to scribble on a wall or on sand with anything he can lay hold on. It is the educator's business to attend to its development as soon as it begins to manifest itself. Drawing should come before the eye has lost its innocence.

From an educational standpoint—as a training for the eye and the hand, as an aid to the formation of the habits of observation, as a training for memory, as a help in cultivating a love for the beautiful, as a means of training the inventive faculty of the child, as a means of showing the proportion between the whole and its parts, and above all, as a means of expression—drawing is of the highest importance. For little children drawing is a much better means of expression than language. Progress in many industries depends upon a good knowledge of mechanical drawing. All the great educators give drawing a prominent place in their schemes of education. Pestalozzi says:—"Drawing should be practised by all. Any person who is in the habit of drawing, especially from nature, easily perceives many circumstances which are commonly overlooked and will form a more correct impression, even of such objects as he does not stop to examine minutely, than one who has never been taught to look upon what he sees with an intention of reproducing a likeness of it. The attention to the exact state of the whole and the proportion of its parts, which is requisite in taking an adequate sketch, trains the habit of observation, ensures accuracy with knowledge and is converted into a habit more productive both of instruction and amusement." A great artist speaking on the same subject says:—"To what heights might their intelligence be trained by simply teaching them to see. I would have drawing made the base of education in all our schools. It is the only language that can express all things. An outline even if ill-shaped, conveys a more exact idea of a thing than the most harmonious sentences in the world. Drawing is an absolute truth, and the language of truth must be taught everywhere." Drawing plays an important part in the child's development; it satisfies the child's natural desire to represent, produce, and create. As Froebel says:—"It is in drawing particularly, that the child proves himself to be a free and capable being and therefore able to create."

Drawing is an aid to the teaching of geometry and the sciences and largely helps writing. It is also a preparation for the real work of after-life. There is scarcely a task or profession in which the need for drawing is not felt.

If drawing forms such an important part in the education of a child, is it not the duty of teachers to think carefully of the methods and means to be employed during the progressive stages of infancy? These mainly depend upon the age of the child and upon the progress he has already made. Soft chalk of different colours may be used for drawing in the earlier stages. As the objects that the child sees around him are generally in a vertical position, he should have a vertical surface to draw upon. A wall-board or paper pasted upon wall is a suitable surface for the child to draw upon. Drawing books and lead pencils may next be put into his hand and after some practice with these materials he may be allowed the use of the brush.

Drawing in the infant classes should be mainly correlated to the nature-lesson, the children expressing by its means the results of their observation. But the subject chosen for drawing should be suitable to the age of the child. Thus, while the silk-worm is the subject of a nature-lesson, the children of Infant A class may be asked to draw the cocoon or the worm but it may be too much to ask them to draw the moth. By setting such tasks as are beyond the capacity of little children we are really discouraging them in their first attempts at drawing. From what has been said above it need not be inferred that the subjects for drawing should be chosen only from the nature-lesson. The objects that children observe either at home or school may also be drawn. This will induce the children to carefully observe the things around them. A story told in the class or a sentence taken from a reading lesson may also be made the basis of a drawing lesson. Such a drawing will test how far the story or the sentence has been understood and will serve to fix in their mind images corresponding to the story or the lesson. By making children draw the picture of an object which was placed before them for a few minutes and removed, they will learn to draw from memory and their power of accurate observation will be promoted. Children may be encouraged to invent a story for themselves and draw a picture of the story they invent. This not only stimulates their creative faculty, but gives them the power to express the results of their creation.

We ought not to expect too much accuracy in the drawings made by children. It is enough if their drawings express their inner thoughts. To teach drawing in these classes we require teachers experienced in child-nature and not drawing masters who expect faultless drawings.

In the earlier stages of drawing children need only show the main masses of objects. They should not draw lines to represent the outlines of objects. With the chalk they place a dot on the paper or wall-board and moving the arm freely round the dot they make a mass of the required shape. By giving just a final touch to this shape they make a drawing of the given object. Oranges, eggs, and such other simple objects may be drawn by this method. Figure 21 shows examples of such mass drawing.

After they have had some practice in mass drawing, children may begin to make drawings of objects with chalk by means of lines. At this stage they may learn to draw with both hands. Figures 22 and 23 show examples of such drawing.

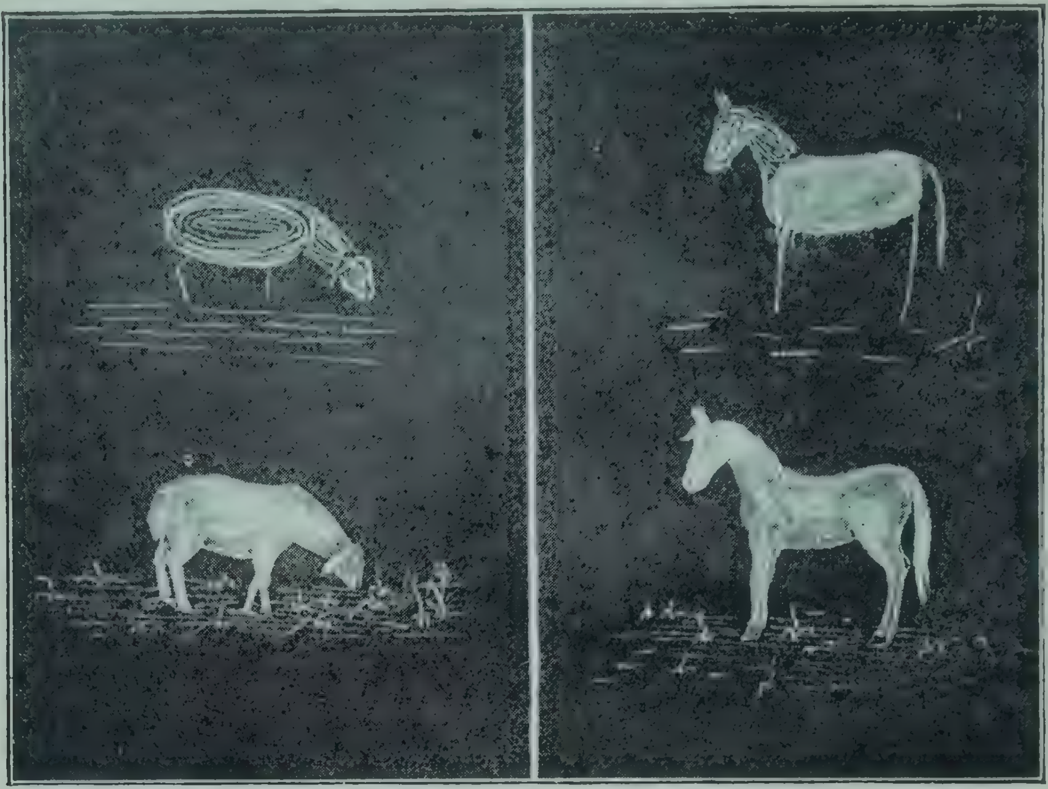

FIG. 21.—MASS DRAWING.

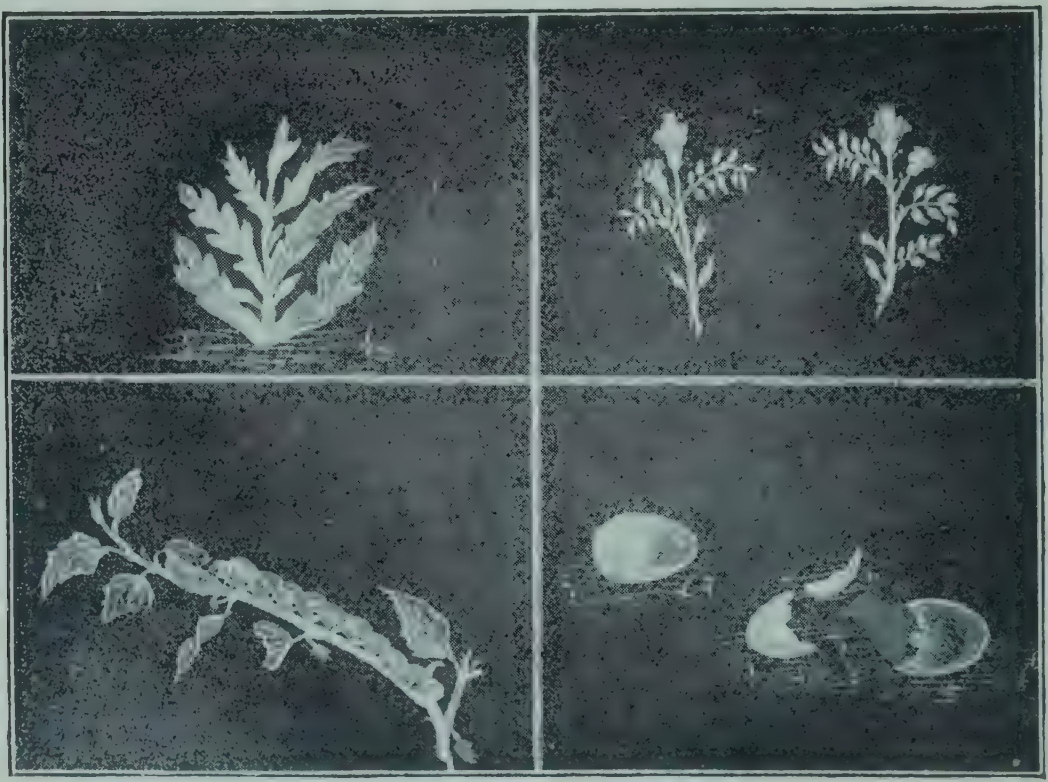

FIG. 22.—LINE-DRAWING WITH CHALK.

After some practice, drawing books may be given along with the pencil. Later on children may begin to use the brush as well. But before drawing object forms with the brush, they have to acquire facility in the use of the brush. Figure 24 shows the method of acquiring such facility.

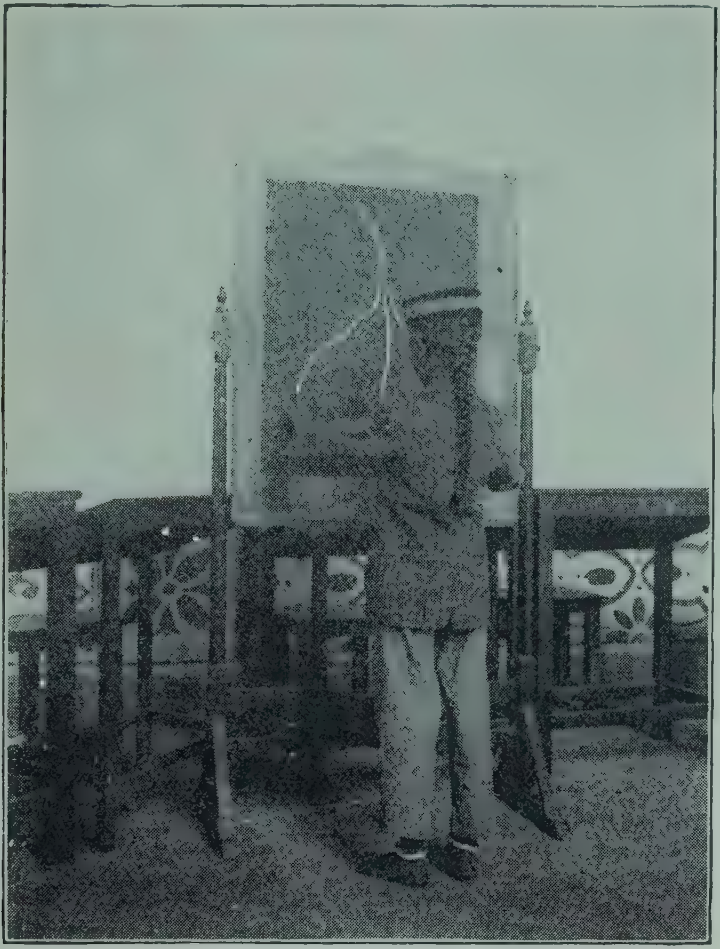

FIG. 23—DRAWING WITH BOTH HANDS.

At this stage it is very instructive to ask the children to make drawings of objects both in pencil and brush and compare them with each other. Figure 25 shows the drawing of an object both in pencil and brush.

While working with the brush children should be given lessons on colour-mixing. From the primary, they should learn to prepare the secondary and tertiary colours. In the beginning it is enough if the children express with the brush the general form of the objects around them; later on, they should learn to express light and shade also.

As clay-modelling assists drawing to a large extent, it should be correlated to drawing whenever possible. If possible, children should occasionally be made to observe pictures by celebrated artists.

The position of the child while he is drawing is very important. The light must be very good, the weight of the body should not be on the right hand but on the feet, and the pencil or chalk should be held lightly.

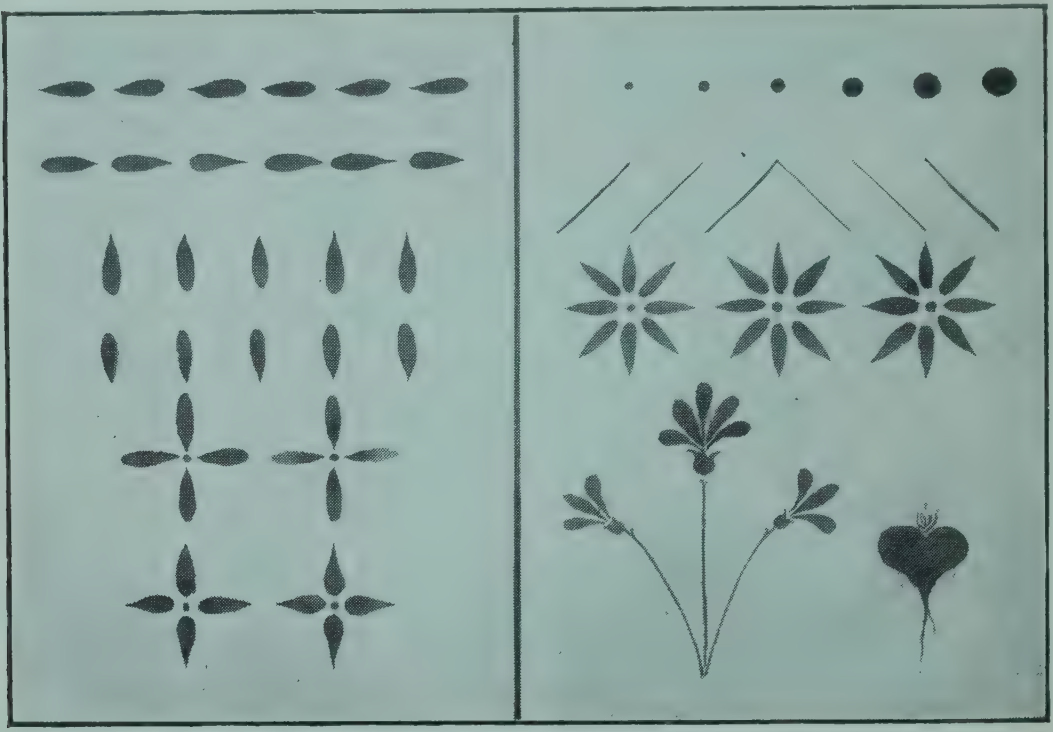

FIG. 24.—BEGINNING OF BRUSH-WORK.

The practice of copying a drawing made by another or from a printed book has not much in its favour and should therefore be given up. The teacher should always bear in mind that in the infant classes the aim of drawing is to enable children to express their own inner thoughts.

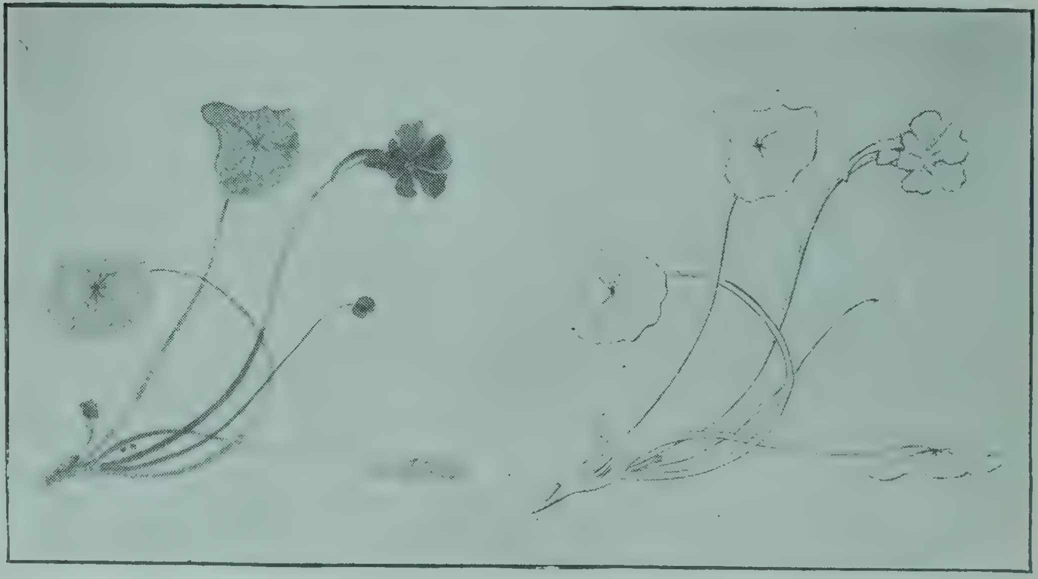

FIG. 25.—DRAWING AN OBJECT IN PENCIL AND BRUSH.

## CLAY-MODELLING.

*I. Educational value.*—

Every little child shows an instinctive desire to play in mud and seems to be very happy while engaged in such play. But many teachers and mothers do not like that their children should soil their hands and clothes by playing in mud. But while soap is so very cheap, it does not stand to reason that children should be prevented from playing in mud for the reason mentioned above. Moreover, if the play is conducted in the proper manner, there is no reason why children should soil their hands or clothes very much.

Clay-modelling satisfies the creative instinct of the child, extends the child's idea of form, trains the hand and the eye and gives him power to express his inner self. Modelling gives scope to the child to express objects as they are in nature—in three dimensions, while in drawing he expresses them in two dimensions only. The teaching of geography can be made very interesting by means of modelling.

The aim of clay-modelling in Kindergarten is not to make the child a good artist but to give him power to express what he has learnt in nature and other lessons. Hence the teacher should not expect the children to make very good models, but should be satisfied if they express the facts of their observation correctly.

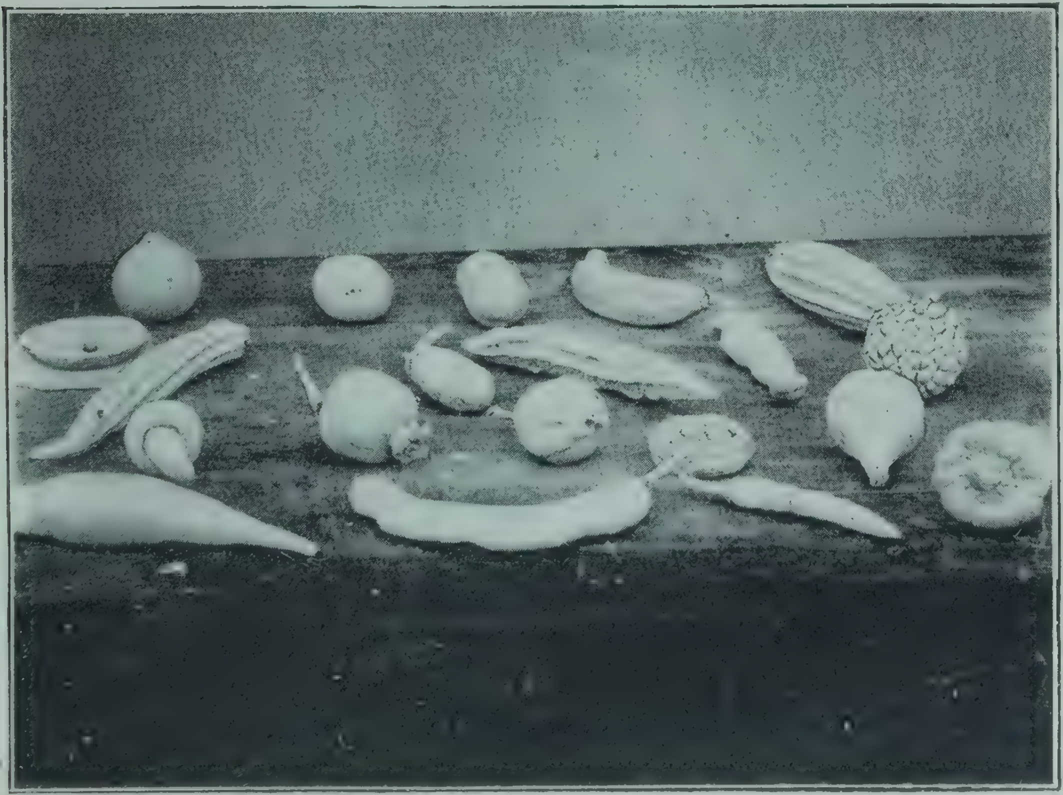

FIG. 26.—CLAY-MODELS.

Thus while studying the broad bean, the children modelled the pods and most of the models they made were anything but satisfactory. But the shape of the pods and the number of seeds contained in them had been correctly expressed by many, and the teacher was satisfied with the result.

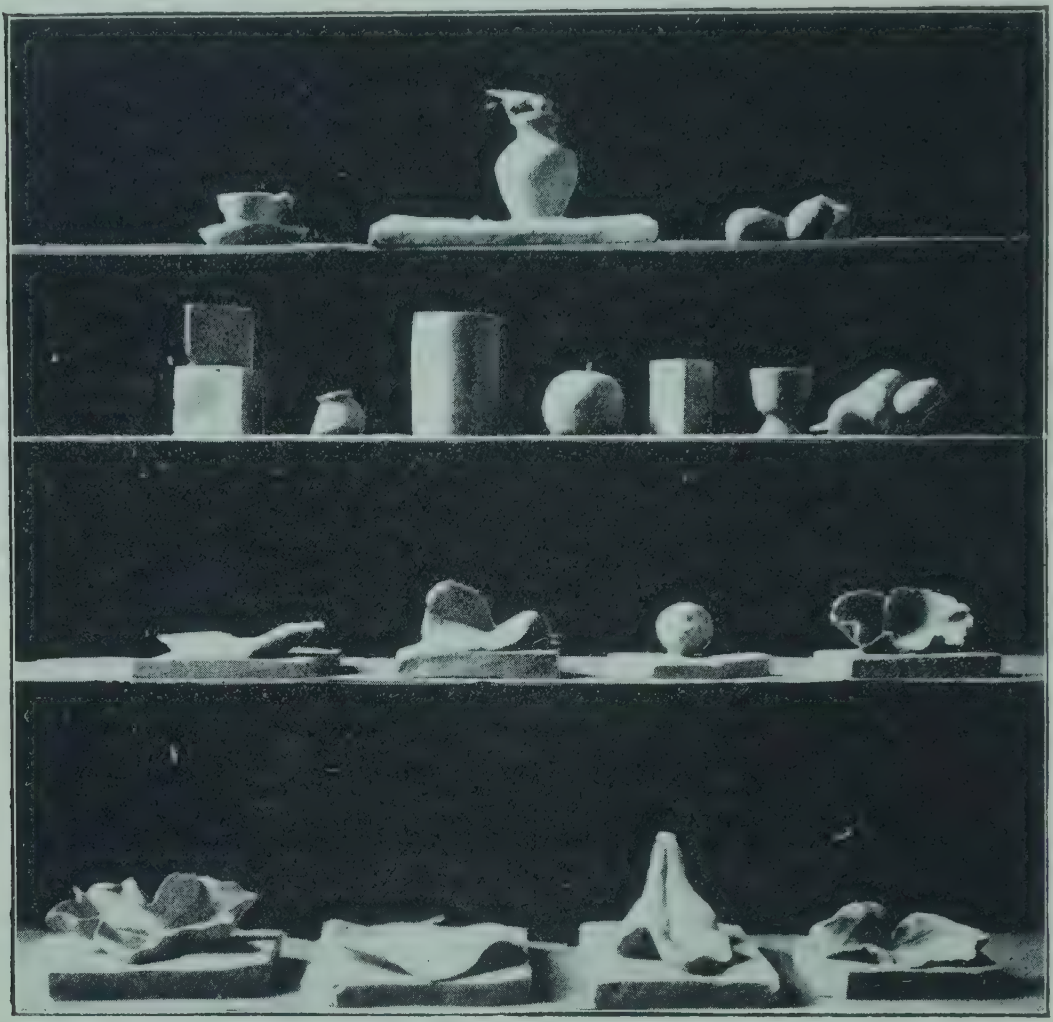

Fig. 27.—Clay models.

*II. Material.—*

The clay required for this work is easily procurable everywhere. The model hardens after drying and can be coloured so as to resemble the natural object. Prepared white clay can generally be used for this work. But those who can afford to buy can use Harbutt's plasticine. This is very soft and can with advantage be used by little children. It retains its softness for a long time, and even if it gets a little hardened it can easily be softened again by the addition of a little vaseline. It requires no preparing like clay before the lesson can begin. It is an antiseptic and can safely be used by all children. But it is a costly substance and few schools can afford to buy it. Moulding does not require the use of many costly tools but only a few simple wooden ones. Children can model on slates, wooden boards, or on modelling trays. If clay is to be used, it should be previously soaked in water and well pounded. The addition of a little glycerine will make it less sticky.

*III. Exercise.—*

Just like drawing, this work should also be properly graded. Thus while the subject of the nature-lesson is the bean, the children of Standard I can model its leaves, flowers and pods, but it is enough if the children of Infant A model the bean-seeds.

Figures 26 and 27 show some of the objects that can be modelled with clay.

# LECTURE XIII.

TIME-TABLES.—SUMMARY AND LIST OF BOOKS RECOMMENDED FOR TEACHER'S STUDY AND REFERENCE.

The preceding lectures have perhaps indicated the play character of the education to be given to infants. The present lecture will briefly indicate the principles which teachers have to bear in mind when framing time-tables suitable for infant schools.

(i) As children are very active in the morning, lessons requiring physical and mental activities in a large measure should be given during morning hours. Thus nature-study, garden-work, arithmetic, reading, writing, etc., can be done with advantage only during morning hours. Of these gardening and nature-study should be done during the first hours of the morning. It is not advisable to take the children out late in the morning as the sun may then be too severe for them. Moreover, as their senses are very keen in the earlier part of the day, they will carefully observe natural objects during these hours.

(ii) Any lesson or occupation done in the infant standards should not be prolonged beyond half-an-hour. It should be given up as soon as there are signs of diminishing interest.

(iii) In the lower primary classes, there should be an interval of 10 or 15 minutes between every two lessons. During this interval the children may have free-play, easy physical exercises or infant drill, or we may give them breathing-exercises. Sometimes we may ask them to sing the songs of their games. In the higher standards, these intervals need not be more than 5 or 10 minutes.

(iv) At the commencement of the day's work, all children should assemble in the school hall. They should pray to God and sing a song showing loyalty to the King. There are many advantages in the whole school meeting in the hall in the morning. The children can meet one another in the morning. As soon as the children meet in the hall they should wish good-morning to their teachers and little friends. This will be their first lesson on politeness. When all children assemble in the hall, each child will know that he is a unit of a big body and that the actions of the whole body will never be well done unless each member does his part properly. For these reasons, it is advisable that the whole school should meet every day in the school hall both at the commencement and the end of the day's work.

(v) The work of the day may well be begun by a short conversation with the children. Such a conversation may be on subjects like the following :—

(i) any object which the children might have particularly noticed either at home or on their way to school,
(ii) any important festival celebrated on the previous day,
(iii) the visit of any important visitor to the institution,
(iv) any peculiarity in the weather of the day,
(v) any change observable in nature owing to change of seasons, or
(vi) any important fact connected with the nature-lesson going on or with the school garden.

After the conversation, the children may be asked to express what they have understood about it by means of drawing. One child may be asked to make his drawing on the Calendar Sheet to mark the day. While this work is going on, one or two children may be asked to take care of school pets, others may water plants in the garden, while a few may be engaged in making the class-room tidy, cleaning the teacher's table, putting fresh flowers upon it, etc. The preceding lectures have perhaps shown the aim of these occupations.

(vi) The other lessons in the morning may probably be nature-study, arithmetic, reading, writing and dictation. When framing a time-table for these lessons, the teacher should see that the work of one class does not disturb that of another. For example, while reading is being done in one class, another class very near may have arithmetic or writing. The time-table should also be arranged in such a manner that between two lessons which involve a great deal of mental strain, there is another which does not tax the mind very much.

(vii) The afternoon hours may be devoted to such work as does not require much mental effort. Kindergarten occupations, organised games, stories, conversation-lessons and recitations—these and similar lessons may be reserved for the afternoon. A quarter-of-an-hour may be reserved at the commencement of the afternoon work for getting ready the materials required for the occupations of the afternoon. During this time the children may learn the words of the songs connected with the games of the afternoon.

(viii) In all the classes the method of correlating the different lessons with the central lesson or with one another should, if possible, be indicated in the time-table.

Model time-tables prepared in accordance with the principles stated above are given in Volume I. Teachers need not exactly follow the time-tables given there, but may make such modifications in them as would suit the special circumstances of their school.

List of books recommended for teacher's use :—

Principles of Education :—

(1) Quick's 'Educational Reformers.'
(2) 'Lectures on the History of Education.' By Joseph Payne.
(3) 'Comenius.' By Laurie.
(4) 'Life of Pestalozzi.' By Dr. Guimps.
(5) 'Pestalozzi.' By Crombie.
(6) 'Autobiography of Froebel.' By E. Michaelis.
(8) 'The Kindergarten System.' By Franks.
(9) 'Dickens as an Educator.' By L. Hughes.
(10) 'Swedenborg.' By Trobridge.
(11) Froebel's 'Education of Man.' Translated by W. A. Hailmann.
(12) 'Talks to Teachers on Psychology.' By W. James.
(13) 'Psychologic Foundations of Education.' By Harris.
(14) 'Educational Studies and Addresses.' By Rooper.
(15) 'Talks on Pedagogics.' By Parker.

Nature-study and Gardening :—

(1) 'First Studies of Plant Life.' By F. Atkinson.
(2) 'Plants and Their Children.' By Dana.
(3) 'Nature-study and the Child.' By C. B. Scott.

(4) Lord Avebury's Books :—
  (a) On Buds,
  (b) Flowers, Fruits, Leaves,
  and (c) Seedlings.
(5) 'A Year's Botany.' By Miss Kitchner.
(6) 'Nature-study and Plant Life.' By Dr. Clifton.
(7) 'School-gardening.' By Miss Latter.
(8) 'How to Make a School Garden.' By Hemenway.

(9) ‘Nature-study Idea.’ By L. H. Bailey.
(10) ‘The outlook to Nature.’ By L. H. Bailey.
(11) ‘Practical Nature-study for Schools.’ By O. H. Latter.
(12) ‘Nature-study and Related Literature.’ By M’Govern.
(13) ‘Nature-study.’ By Mrs. L. L. Wilson.
(14) ‘Gardening in India.’ By Woodrow.
(15) ‘First Book in Botany.’ By Oliver.

Books about games :—

(1) ‘Child and Child Nature.’ By Blow.
(2) ‘Mottos and Commentaries on Froebel's Mother-Play.’ By S. Blow.
(3) ‘The Songs and Music of Froebel’s Mother-Play.’ By S. Blow.
(4) Symbolic Education. } By Blow.
(5) Letters to a Mother. } By Blow.
(6) ‘The Republic of Childhood.’ By Wiggins (2 vol).
(7) Children’s Right. } By Wiggins.
(8) Children of the Future. } By Wiggins.
(9) ‘The Gifts of the Kindergarten.’ By K. D. Wiggins.
(10) ‘Child Life in Our School. By Miss Brown.
(11) Miss Latter’s books on Kindergarten games and occupations.

# SCHEMES OF NATURE-STUDY.

Two schemes of nature-study prepared by Miss Latter for use in her lectures and in the infant classes of the Government Girls' School, Bangalore, have already been given as illustrations of her method of work.

The following are some of the schemes of nature-study that have been worked out in the Primary Classes of the Practising School, attached to the Government Normal School at Mysore, where the education of infants is being conducted on the principles expounded by Miss Latter in her lectures.

## 1. The French bean.

The study of this plant was conducted in the Practising School in December 1907 and in January 1908 according to the following scheme.

(1) The aim :—

The French bean is a familiar plant in our country. The pods of this plant are largely used as an article of food. This bean was made the subject of special consideration as its life history could be studied in the short space of about six weeks.

(2) Preparation :—

Before commencing the special study of the plant in the classes, the teachers should plant their own seeds and keep a record of their observations. They should think of the familiar names that should be given to children instead of technical terms. They should also select stories, poems for recitation, etc., that should be used in connection.

(3) Plan of work with the children :—

(1) Planting the seeds :—

Each child should have a saucer of his own, put some wet sand into it and place a seed upon it. The child will be very much interested in watching his own little plant. While the children place the seed on the wet sand, they should give a description of the seed in simple words. By placing the seed on the surface of the sand, the curiosity of children to see the formation of roots will be satisfied. Little children should not be allowed to pull up plants, but should be taught to cherish and care for them.

> "In the heart of the seed, buried deep, so deep,
> A dear little plant lay fast asleep,
> 'Wake,' said the sunshine 'and creep to the light'.
> 'Wake,' said the voice of the raindrop bright,
> The little plant heard and it rose to see
> What the wonderful outside world might be."

Tell the children how the mother bean placed the seed babies in a cradle and covered them with a warm coat all through the winter. They slept all the winter and want to wake up now. We shall help them to do so. Let the children see how the coat first wrinkles, then becomes smooth again. Draw their attention to the place where the little foot comes out. Let them see how fast it grows and how its branches first appear as knobs. Point out how the seed splits and pushes off its coat. Show how the root insists on growing downward. Soak a seed in water, split it, and show the little plant inside.

(ii) The little plant :—

Now our bean has woke up. Notice that the foot has pushed down deep into the sand, that the stem is arched and acts like a wedge to pull the two halves of the seed up. Notice that from between the two seed-leaves appear two little green leaves. Now the covering of the seed leaves has fallen away and they have turned green. Let the children see that the seed-leaves wrinkle as the next leaves grow larger and larger. The children should notice that the third and fourth leaves are like the leaves of the sacred fig tree. The teacher may tell that the seed leaves wrinkle and fall away as they give the food contained in them to the plant. Refer to how the mother feeds the baby and how children go to her when they are hungry. Ask how the orange looks when the children have sucked out the juice. As the baby at home gets older it begins to stretch out its hands and tries to get things to eat, so the baby plant, as it grows, also begins to stretch out its hands and tries to get food for itself. Who can show me its hands? How many fingers are there in it? Now the bean is old enough to talk and tell its own story. Have a bean tell a story about the people (mother bean, mother nature, children) who helped her to grow and the way she is learning to do things for herself.

(iii) The big plant:—

Let children see the compound leaves of the big plant and compare these with the first four leaves. Let them learn to distinguish the leaf buds from the flower buds.

(iv) The flower:—

The flower bud is long and arched at one end. When it opens we shall see the wonderful things that are inside. One has opened this morning. It looks like a beautiful butterfly. See there is a broad upper wing and two little wings at the side and a little boat-shaped body below. Shall we see what wonderful things there are inside this little boat? Just inside the boat there are long threads with little knobs at the end and deep in the middle of the boat there is a tiny pod. We see little bees visit this boat very often. Some day we shall make the bee tell us the story of the wonderful secrets of this boat.

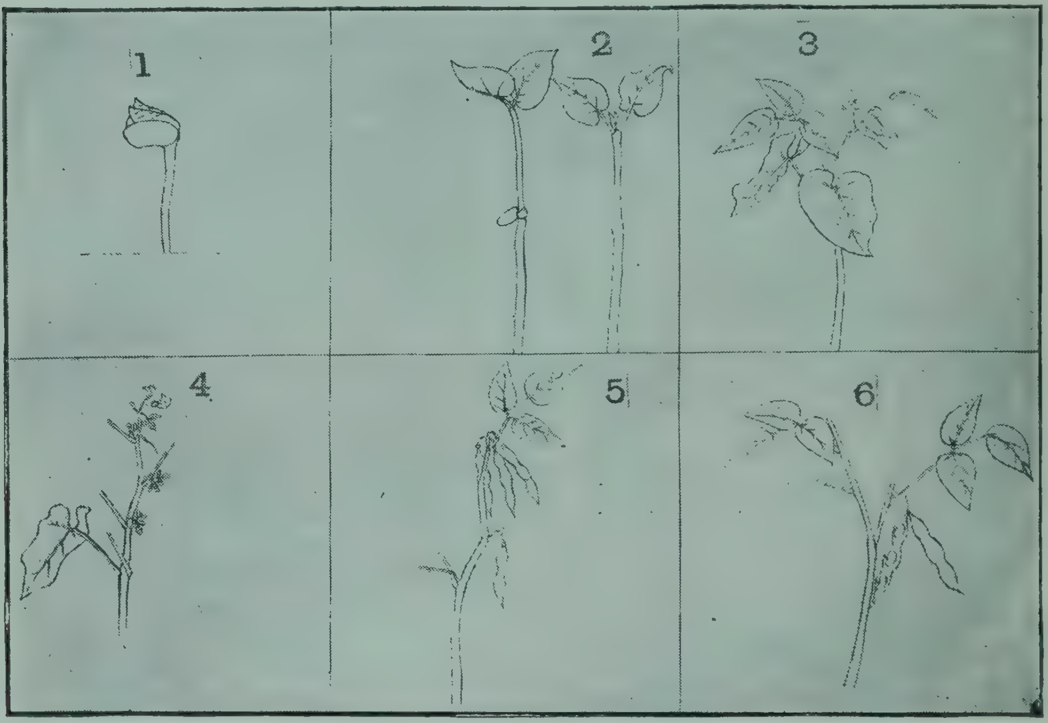

FIG. 28.—DRAWINGS MADE BY CHILDREN IN CONNECTION WITH THE STUDY OF THE FRENCH BEAN.

(v) The pod:—

When the flower leaves fall, a tiny pod is left in the place of the flower. This pod grows bigger and bigger every day. This is green at first, and later on becomes beautifully spotted with red and yellow. If we open one of the pods we see the beans in their green cradle. These are firmly fastened to the walls of the cradle, each in its place. These are very eager to go out and see the world. Hence when the walls of the cradle dry up and split, the beans go out immediately. On some of the beans we see beautiful stripes· One day you will hear a funny story about the stripes.

The gifts, occupations, games, stories, and recitations used in connection with the study of the Fench bean.

| | Class I | Infant B | Infant A |
|---|---|---|---|
| Drawing (free and other). | Various kinds of beans, first leaves, leaves at a later stage, plan of the garden and indication of the bean beds in it, bean pod, a bunch of pods, watering can, seed box, garden tools, saucer. | Various kinds of beans, first leaves, leaves at a later stage, bean pod, saucer, watering can, garden tools. | Various kinds of beans garden basket, flower vase, bean leaf, pod and garden tools. |
| Brush-work ... | Various kinds of beans, bean leaf, a bunch of leaves, bean in a saucer, bean pod, bean flower. | ...... | ...... |
| Clay-modelling ... | Beans in saucer, leaf, pod, flower vase, garden tools. | Various kinds of beans, garden basket, saucer, bean leaf, garden tools. | Various kinds of beans, flower pot, saucer. |
| Paper-folding ... | Basket, tray, table, chair, seed-vessel or bag. | Basket, table cloth, garden bench, seed vessel or bag. | Flower pot, seed-vessel or bag. |
| Gift III ... | ...... | ... .. | Garden, garden-bench, garden-well, chair, front of the seed cupboard. |
| Gift IV ... | Garden, well, table, seed cupboard, chair, shop, fire-place. | | ...... |
| Sticks and rings | ...... | Basket, saucer, flower vase, knife, flower pot, watering can, fire garden fence, table, chair. | |
| Fraying ... | ...... | ...... | Mats to go under the saucer, little dolly for scaring birds, brush. |
| Gift II ... | ...... | ...... | Cube as garden bench, sphere for drawing water, cylinder as a garden roller. |
| Sand-work ... | ...... | ...... | Garden beds, fence with beads or cowries, planting flowers or twigs in the sand garden. |
| Stories ... | (1) How the beans grew, (2) How the bean came to have a stripe, (3) Little seed and (4) The sleeping princess. | | |
| Recitation ... | Songs on winter | ...... | ...... |
| Game ... | Seed sowing | ...... | ...... |

4. Examination of other plants of this order :—

When the special consideration of this plant is going on, the children should plant in the garden the double runner bean, the broad bean, and other beans belonging to this order. They should compare the growth of the French bean with other beans.

5. Uses of the plant :—

The beans grown in the garden should if possible be cooked in the school and the children should have a little bean feast. The teacher should if possible join them in their feast.

6. Garden work :—

The children should water the plants in the garden every day, pull out the weeds, clean the paths and plant sticks as supports to the runner beans.

Children should keep a record of the results of their observations in language and drawing. In Infant A and B it is enough if the children keep a record only in drawing.

Figure 28 shows some of the drawings made by children in connection with the study of this plant.

The following is one of the stories used in this connection :—

*How the beans grow.*

A little girl lived in a house which had a little yard in front. The houses in that street had similar yards in front. It was spring time. Little children like her were planting flower seeds such as cosmos, balsam, chrysanthemum, nasturtium, etc., in their yards. She too wished to have a plant of her own which would bear beautiful flowers. She expressed her wish to her uncle and requested him to give her a few seeds. He gave her a few bean seeds and asked her to take care of the plants when they grew. She thanked him, prepared a bed and planted the seeds in it. She visited the bed every morning, watered it and watched for the coming up of the bean plants. What do you think she saw in three or four days? No plants came up but she saw four beans coming up. Thinking that she had not planted the seeds sufficiently deep she covered the beans with earth. In two or three days again the beans came up, she covered them again with earth and they came up no more. A few days after, her uncle paid another visit and asked her how her beans were getting on. She told him all that had happened. He took her to the bed, asked her to dig and see what had become of the beans. Poor beans! they were all withered. He told her that if she had not covered up the beans but had only waited for a day or two she would have seen a little plant coming up from between the two halves of the seed. The uncle gave her a few more seeds. She planted them as before. This time she did not cover them with earth when they came up but watched for the little plant which her uncle had spoken about. She was not disappointed; in a day or two, a little plant rose up from between the halves to her great delight. She tended the plant carefully and it grew day by day. After some time she planted a stick as a prop to her little plant. The plant entwined itself on the prop and grew taller every day. In good time there were beautiful flowers on it. These flowers gave place to long green pods. What do you think she did with the pods? She did not eat them all herself, but took them to her mother and requested her to cook them. When they were ready she shared them with her father, mother, brothers and sisters. They were all very much pleased but it was the girl who felt the greatest pleasure. Can you tell me why?

## II. THE SILKWORM.

'He breaks no thread
His hand has spun.'

"If thy heart be right, then will every creature be to thee a mirror of life and a book of holy doctrine."

To conduct the study of the silkworm, eggs were procured from the silk farm at Bangalore. These were hatched on the 30th of December 1907 and the study began on that day and continued for two months. The following scheme of work shows the method in which the study was conducted.

I. Preparation by teacher :—

For some days before the commencement of the study, the teacher should observe eggs, worms, cocoons, and moths, and keep a record of his observations in drawing and writing. He should also read books about sericulture and note additional points.

II. Point of view with regard to children :—

To create love for God's humble creatures and to give an idea of the glory of God who has taught these little creatures to spin long, uniform, delicate and shining threads—these are the main aims in the study of the silkworms. Our selection of the subject has also been determined by the fact that silkworm-rearing and silk-weaving are important industries in some parts of the Province. By the study of the silkworm, children learn to understand and appreciate what may be told or read to them about the worm and its cocoon and the manufacture of silk. This may serve to impress parents who may not be in entire sympathy with the nature-study work, with the practical aspects and value of such work. It will also serve to relate the caterpillar spinners to the everyday life of the children. The delicate colour of the worm and its graceful form make it attractive to the children and the study of its life-history becomes exceedingly fascinating. We are able to trace the gradual change of outward form as the inner life develops and this is one of nature's most wonderful things. Think of the story—the eggs yield the caterpillars, these caterpillars store up the substance required for the chrysalis, it is in the chrysalis state that the organs and the form of the moth are developed and the chrysalis finally throws away its skin and attains the form of a perfect insect. Here we see an example of the continual purpose of life—the attainment of a higher and higher form of existence. But children can only get glimpses of these truths.

III. Plan of work with children :—

(i) *Home.*—Children will have observed cocoons of caterpillars on trees. Tell them that the silkworm, just like these caterpillars, was also living on trees, and that men on account of the great usefulness of the creature are now rearing it in their homes. (Let children rear a few silkworms on the mulberry shrubs in the garden. They will then observe the silkworm in its natural home.) They should then be taken to the room where the worms are kept and should see them in the different stages of growth.

(ii) *Eggs.*—The way in which they have been laid, the care which the mother has taken to find a place for each egg, their beautiful colour, the various changes which they undergo in colour, their size and number—all these should be carefully noticed by children. In the examination of the eggs the children should use a magnifying glass.

(iii) *The little worm.*—If children are observing the eggs every day, they will notice that after a few days little worms come out of these eggs. They should notice the way in which the little worms come out. Let them also notice the difference in colour and size between the young and the grown-up worm.

(iv) *The big worm.*—If children carefully notice a developed worm, they will see that the fore legs are useful for motion and that the hind legs are only useful for holding on to anything. Notice that there are eight legs and nine breathing holes on each side. Notice the way in which the worm moves its powerful jaws when eating the mulberry leaf. Let the children then see the riddled condition of the leaves. The way the creature raises its head now and then and stretches its body should also be noticed. Let them also notice that the creature frequently changes its coat as we do ours, and that it changes its colour also very often and finally turns golden yellow. Besides the head, they should see that there are nine cylindrical divisions in the body. Let them also observe that the creature gives up food now and then and sleeps quietly. Draw their attention to the size and colour of the head and the small eyes in it. That the creature can see, has delicate perception of touch and possesses the sense of taste should be shown by little experiments; in the same way it can easily be shown that the worm has no sense of hearing. The children should carefully examine the creature's mouth and see the wonderful arrangement there is in it for spinning silk. When the creature is put on the bamboo screen, the children should see how it spins silk by moving its head round and round. The magnifying glass should be used whenever possible.

(v) *The chrysalis.*—The teacher should say that the death-like sleep in the chrysalis state is only a preparation for a higher state of existence. A week after the worm has made the cocoon, it may be put into lukewarm water and the silk wound up on a reel. The chrysalis should then be preserved in a warm box. The cocoon should on no account be put into hot water so as to kill the chrysalis.

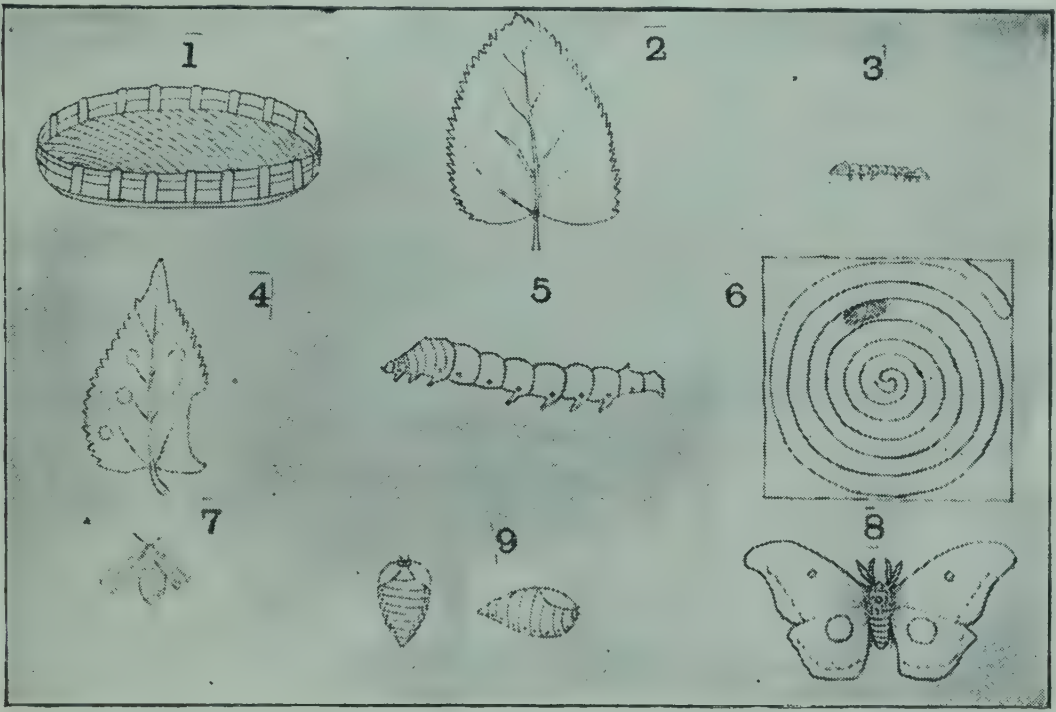

FIG. 29—DRAWINGS IN CONNECTION WITH THE STUDY OF THE SILKWORM.

(vi) *The moth.*—After some days the children should see that there are signs of movement in the cocoon. Then they will observe that a gray moth will come out of the cocoon having made a hole in it. They should then observe that the cocoon has lost its beauty, that the silk has become very rough and that the threads are broken in the middle. Draw their attention to the wings, the general shape, the structure of the body, the six legs, the long antennæ and the broad eyes of the moth and let them find the difference between this stage and that of the worm. Place a little honey before the insect and let them see how the moth thrusts out its long tongue.

(vii) *Observation of other worms belonging to this species.*—During the study of the silkworm, the children should keep other worms belonging to this order in glass bottles, should notice the various stages of their existence and compare them with those of the silkworm.

(viii) *The mulberry plant.*—While the silkworm is the subject of special consideration, the children should also observe the leaves, flowers and fruits of the mulberry plant.

(ix) *Winding silk from the cocoon.*—The teacher should show the mechanical contrivance used for this purpose and the children should wind the silk on the reel. Figure 29 shows some of the drawings made by children during the study of the silkworm.

(1) Worms in tray.
(2) Mulberry leaf.
(3) Young worm.
(4) Mulberry leaf partly eaten up by worm.
(5) Grown-up worm.
(6) Cocoon on bamboo frame.
(7) Moth.
(8) Polyphemus moth developed at school.
(9) Chrysalis.

IV. Garden work :—

Gathering mulberry leaves, plucking of dead leaves, planting mulberry cuttings, tidying of the garden paths, weeding the beds.

The gifts, occupations, games, stories and recitations used in this connection.

| | Class I | Infant B | Infant A |
|---|---|---|---|
| Drawing (free and other). | Mulberry leaf, spray of mulberry leaves, mulberry bush, a garden with mulberry bush, silkworm, silkworm on mulberry leaf, a basket, a glass jar, trays for keeping the worms, frame on which the cocoons are made, the pulley for winding the silk, garden tools, the cocoon, the moth, the chrysalis. | A tender mulberry leaf, a full-grown mulberry leaf, larva box, garden tools, a watering can, silkworm, chrysalis, cocoon, tray for worms, frame for making cocoon. | Mulberry leaf (tender and full-grown), silkworm, silkworm on leaf, cocoon, garden tools, watering can, tray for worms, larva box. |

| | Class I | Infant B | Infant A |
|---|---|---|---|
| Brush-work ... | Mulberry leaf, spray of leaves, the fruit of the mulberry, silkworm, silkworm on leaf, a leaf with clusters of eggs on it, chrysalis, cocoon. | ...... | ...... |
| Clay-modelling.. | Mulberry leaf, leaf with eggs, moth, chrysalis, cocoon, silkworm, tray, mulberry fruit, spray of leaves | Basket, mulberry leaf, spray of leaves, chrysalis, cocoon, silkworm, tray. | Mulberry leaf, cocoon, silkworm, tray. |
| Paper-folding ... | Mulberry leaf, larva box, table,chair, tray, basket, coat, umbrella, lamp shade. | Basket, table cloth, tray, umbrella, lamp shade, chair, coat. | Table, tray, basket, umbrella, lamp shade, box. |
| Gifts III and IV (III for A and IV for B). | ...... | Garden, wall, well, table, seat, plan of garden with a mulberry tree in it, box, shelf, garden house. | Garden, wall, well, table, seat, plan of garden with a mulberry tree in it, box shelf, garden, house. |
| Sticks and rings | ...... | Basket, water can, tray, front of box, table, chair, garden, tools, umbrella. | Flower pot, water can, front of table, chair, garden tools, front of box, umbrella. |
| Gift I ... | ...... | ...... | Colour lessons, game of drawing water, and other ball games. |
| Gifts V and VI ... | Garden house, garden, basket, cupboard, tray, garden chair, table. | ...... | ...... |
| Sandwork ... | (In connection with Geography). | Well, river, mountain, grassy plain, plan of garden. | Garden beds, playground, cocoon. |
| Tablet-laying ... | The surfaces of figures constructed in Gifts V and VI. | ...... | ...... |
| Paper-plaiting ... | ...... | Mats to go under glass jars, little bags to store the cocoon. | ...... |
| Fraying ... | ...... | ...... | Mats to go under glass jar, dolls, little brooms. |
| Thread-laying ... | ...... | ...... | Mulberry leaf, cocoon, worm, table, chair. |
| Bead-threading... | ...... | ...... | Worm, egg, fence, moth by threading on a wire. |
| Games ... | Trees on the roadway | Seed-sowing. Game of building the cocoon. | |
| Stories ... | A lesson on faith. The life of a silkworm. The goddess of the silkworm. The caterpillar. | | |
| Recitation ... | "The silkworm." By Mary Howitt. | | ...... |

A translation of the following verses by Mary Howitt was used for recitation.

### THE SILKWORM.

(i)

Silkworm on the mulberry tree,
Spin a silken robe for me ;
Draw the threads out fine and strong,
Longer yet—and very long ;
Longer yet— 'twill not be done,
Till a thousand more are spun,
Silkworm, turn this mulberry tree,
Into silken threads for me !

(ii)

All day long and many a day,
Busy silkworms spin away ;
Some are ending, some beginning,
Nothing thinking of, but spinning !
Well for them ! like silver light,
All the threads are smooth and bright
Pure as day the silk must be,
Woven from the mulberry tree !

(iii)

Ye are spinning well and fast ;
'Twill be finished all at last,
Twenty thousand threads are drawn,
Finer than the finest lawn ;
And as long, the silken twine,
As the equinoctial line !
What a change ! The mulberry tree
Turneth into silk for me !

### III. THE SUN.

" O glorious orb, ! O golden Sun !
I would I had an angel's ken,
Your deepest secrets to divine,
And read your mysteries to men."

The study of this grandest object in nature was conducted in the Practising School during the months of March, April and May 1908. The following scheme will show how the subject was treated.

I. Preparation by teacher :—

The teacher should read books on Astronomy and Botany, and prepare notes for his work. He should also read the works of famous authors who have written about the sun.

II. The standpoint with regard to children :—

As the sun is powerful during these months, it is easy to show children that the sun is necessary for the well-being of the whole world. It is the sun that gives heat and light to the whole world and that gives rise to the vegetable kingdom which not only beautifies the earth but is essential for the life of the whole animal kingdom. Even man is only a machine that uses the energy of the sun in action.

There is another higher aim in conducting the study of the sun. The sun is a very good illustration of the immense power of Him who is the Creator of the whole universe. Though we receive benefits from the sun every day, we very often forget Him who made the sun. The excessive heat that we receive from the sun at one time of the year, the bitter cold that we feel at another time owing to the absence of this heat, the dense clouds caused by the same sun at another time of the year—these may appear to be very unpleasant to us. Nevertheless they are quite necessary for our existence. Similarly, God may appear to give us great sorrow and trouble at one time, but we must know that it is for our ultimate good that he does all this. We can also tell children that it is the sun who, by his immense power, keeps us in his warm atmosphere without allowing us to wander away into the cold space.

III. Plan of work with the children :—

(i) "How bright it is to-day ! All of us feel very glad, can you tell me why ? Who saw the sun this morning ?" After a short conversation of this nature, the teacher should take the children out and make them see the sun through a smoked glass. They should observe the shape, brightness, etc., of the sun. Every day at a particular hour, children of Class I should mark the position of the shadow of a stick fixed in the middle of a circle.

(ii) *Sun's rays.*—Sun's light comes to us in the form of rays, these rays bring us not only light but also heat. They wake up the flowers on the trees that were sleeping all through the winter. They call back the birds that had left us during winter and the songs of the birds fill our hearts with gladness. Children should hold one hand to the sun and should observe that it is warmer than the other. They should also see that windows, doorways, etc., on which sun's light has fallen are warmer than others. In the garden they should observe how the flowers hold their cups to the sun.

(iii) *The path of the sun's rays.*—The sun's rays come to us in the nearest or straight path. They cannot come to us through a wall or a closed doorway. But sometimes they come to us through a closed doorway. Can you tell me when ? Can you tell me a few other things through which light can come ? What other things seem to come along with the rays ? What different colours do you notice in them ? The teacher should take the children to a dark room and allow sun's light into it through a small aperture in a window. They should observe the coloured specks of dust floating in them. In the path of the rays, he should hold a glass plate, a mica plate, a glass vessel full of water and a wooden plank and show which are transparent to light and which are not. On the wall of the dark room the children should observe the images of children moving outside or of the trees in the compound.

(iv) *Catching the rays.*—The children should hold a mirror obliquely to the rays in the dark room mentioned above and see a picture of the sun formed in some part of the room. By moving the mirror, they should make the image fly to different parts of the room. They should observe the difference between holding a mirror and a glass plate in the path of the rays. A ferrotype paper may be placed in a photo-frame and a leaf placed upon it. After an exposure of five or six minutes to the sun's rays, the paper should be put into fresh water. The children will then see the picture-making power of the rays. Children of Class I may take a photograph by using the camera.

(v) *The prism.*—In the dark room, the children should hold a prism in the path of the rays. The light passing through the prism should be made to fall on a screen or a wall. The children will then see that the white rays of the sun are composed of rays of seven different colours :—" Who has seen the rainbow ? What is its shape ? When and where is it generally seen ? What different colours do you see in it ? "—Such questions will make plain the composite character of the sun's rays. Little children may blow soap bubbles and see the different colours in it. The children may now be asked the reason of the different colours they saw in the specks of dust floating in the rays of the sun.

(vi) *The sun as the giver of health.*—Let children plant a few seeds in a flower-pot in the garden and a few others in a pot in the dark room. Let them observe the difference in growth between the plants in the two pots. Children should observe that plants in the garden growing in shade seek after sunlight. Let them see that the sunflower and many other flowers hold up their faces to the sun. Ask children if they have seen any difference in health between their little friends living in well-ventilated and well-lighted houses and those living in dark and badly ventilated houses.

(vii) *The sun as a painter.*—The children should be made to see the beautiful green colour he gives to leaves and the various lovely colours he gives to flowers. The difference will be plain if they observe plants growing in sunlight and in shade. The sun gives beautiful colours to some substances but he takes away colour from some other substances. Ask children how their new coloured clothes look after a year. Let children see on the wall the difference between a place where a picture is hung and the rest of the wall.

(viii) *The scorching and drying power of the sun.*—Ask children how the grass in the plain looks in summer and what change they observe in the complexion of people exposed to the sun.

A lens may be used to show the burning power of the sun. Let children keep a dish full of water in the sun and another in the class-room and observe the difference in the rapidity of evaporation.

(ix) *The sun as the cause of rain.*—Ask the children what became of the water placed in the sun. Were they able to see its going away? How stealthily it went! Heat water in a vessel and let children see how it goes away. Take another vessel and wipe the outside of it carefully by means of a towel. Then put ice into it, let them see the drops of water that collect on the outside. Who heats the water of our tanks, lakes and seas? How does it go up? Have any of you gone to the top of a hill? How does it feel there? What happens to the vapour when it gets there? Elicit the cause of rain by such questions.

(x) *Stored-up power of the sun.*—Get from the children that it was the sun who made the plants grow. Tell them that these plants turn into coal by being buried in the ground. Show traces of leaves in a piece of coal. They will then see that coal represents the stored up power of the sun.

(xi) *The help that the sun gives to travellers.*—Ask children at what point of the heavens the sun rises, where he sets and what use travellers can make of this knowledge. Ask them when the sun will not be able to help us in finding out the required direction. Place the compass before them and show them its use.

(xii) *Shadows.*—Place a flower-pot in the sun. Let children see where the shadow is formed. Ask them why the shadow is formed there. Let them observe the length of this shadow at different times of the day. Let a child hold up a ball in the dark room. Let another child move a lamp round the ball at different distances. They will find that not only does the shadow move round as the lamp moves round but the size of the shadow varies according to the distance at which the lamp is held. This experience is applied to the case of the sun. A straight stick is fixed in the school compound and its shadow measured at different times of the day. The children should measure their own shadows when they come to school and when they go home.

(xiii) *Time.*—The sun's rays enter our room gently and wake us up. This is morning. This is the busy hour of the day; birds, beasts, flowers, children and grown up men and women—all these should work at this time of the day. Later on the sun sets and darkness covers the whole earth. This is the time of rest. Even some plants sleep at this time of the day. The children should be led into the garden and should be made to see which flowers have opened their beautiful cups, which are just opening and which flowers close their cups before evening. They should be taken to the dark room, and an orange should be held there in front of the lamp. They should observe which side and what portion of the orange is in the light and which in darkness. The knowledge they thus gain may be applied to day and night.

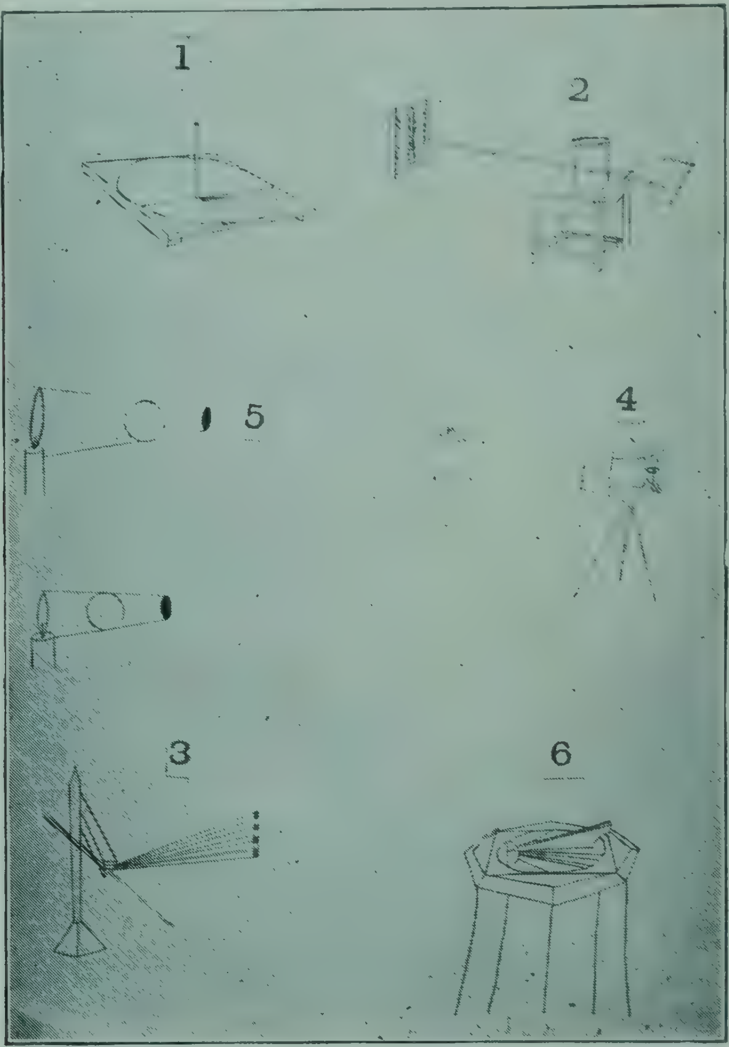

FIG 30.—DRAWINGS IN CONNECTION WITH THE STUDY OF THE SUN.

(xiv) *The sun-dial.*—Long ago people had no watches. Do you know what they were then doing to find out time? They were finding time by the help of the sun. They made a dial very like the dial in our clocks and fixed a stick in the middle of it. They were able to find out time by the length of the shadow which the stick made but this sun-dial was not useful during night or on cloudy days. Then they invented sand or water clocks to find time. But even those were not satisfactory. Hence they invented the big clocks and the small watches that we are now using. Children should draw a circle on a paper, fix a stick in the middle of the paper, draw lines at the end of each hour and make their own sun-dial.

(xv) *Garden work.*—Planting spring seeds, giving support to broad beans, peas and sunflower plants, removing knol khol and onion seedlings from pots and planting them in beds and weeding the beds.

Figure 30 shows some of the drawings which the children made during the study of the sun.

(1) The circle on which children marked the shadow of a stick every day at a particular hour.

(2) Sun's rays passing through a glass plate, a glass vessel containing water and obstructed by a wooden plank.

(3) Sun's rays passing through a prism.

(4) The use of the Camera.

(5) Shadow of the ball when light is placed at different distances.

(6) The sun-dial in the garden.

The following is one of the stories told during the study of the sun.

### *The rainbow.*

Long ago there was a good girl by name Waterdrop. She was the daughter of the Sea-king. She was so good that she was loved by every one who met her. She tried to do good to every one who looked up to her for help. The flowers in the garden, the crops in the fields, the birds in the greenwood—all looked up to her for support and she helped them every day. The Sea-king wished to get a very good husband for her and he saw that except the sun there was no one who was a suitable match for her. Hence he married her to the sun. These two lived very happily. They had a daughter by name Iris. Her father gave her beautiful clothes, the colours of which resembled those of the sky at sunset. He employed her as messenger to the people of his kingdom. For her use, he constructed a beautiful bridge of seven colours. The bridge was so large that it extended from the sky to the earth. Iris walked on this bridge and carried her father's message to the people. The swan maidens helped Iris by carrying this bridge to the earth. Sometimes Iris walked on this bridge in the morning to warn sailors of the coming storm, sometimes she walked on the bridge in the evening to tell people that there was nothing to be afraid of that night. Wherever she went she always carried a message which was welcome to the people. Can you tell me the names of the flowers of your garden whose colours resemble those of her dress?

Gifts, occupations, stories, recitations and games used in connection.

| | Class I | Infant B | Infant A |
|---|---|---|---|
| Drawing (free and other). | The window through which the sun's rays enter the class room or hall, the garden flowers of the season, garden trees which have put forth new leaves, sun's rays passing through water vessel, glass plate, mica plate and obstructed by wooden plate, a tree and its shadow, the sun, the rainbow, the grassy plain around the school, the butterflies in the garden, the burning glass, the sun-dial, sand clock, sun's light passing through a prism and broken up into coloured rays. | The window through which the sun's rays enter, the garden flowers, trees with fresh leaves, the sun, the rainbow, the grassy plain around the school, the burning glass, the sand clock. | The sun, the rainbow, the window through which rays enter, the trees with fresh leaves, the burning glass, the sand clock. |
| Brush-work ... | Lily flower, the rainbow, the sun, the ball and its shadow, the sunflower plant, a flower. | ...... | ...... |
| Clay-modelling ... | Water vessel, prism, the sun-dial, the flower pot, the flower vase, the lily flower, photo frame. | Water vessel, prism, the sun-dial, flower pot, flower vase. | Water vessel, prism, flower pot, flower vase. |
| Paper-folding (squares and oblongs to be used). | Table cloth, baskets of different kinds, bags, fans, mirror, tent, umbrella, binocular. | Baskets of different kinds, table cloth, bags, fans, tent, umbrella, binocular. | Table cloth, baskets, bags, tent, fans, umbrella. |
| Gift III ... | ...... | ...... | Window, front of school house, the sun-dial, the school garden (8 or 10 children may put their blocks together and build). |
| Gift IV ... | ...... | The dark mine, ponds, wells, towers, garden, house. | ...... |
| Gift V ... | Sofa with paper dolls, bench, table, chair, tower with paper staircase, prism, well. | ...... | ...... |
| Gift VI ... | High tower for observation of the heavens, verandah, house fronts, the garden with a house in it, water tank. | ...... | ...... |
| Sticks and rings | ...... | The sun, window, water can, flower vase, tube for blowing soap bubble, sun-dial, sand clock, garden tools, prism, cap, fan, photo frame. | ...... |

| | Class I | Infant B | Infant A |
|---|---|---|---|
| Lath-laying ... | Window, fan, tower | Garden, fence, gate | ...... |
| Gift I ... | ...... | ...... | Colour songs, ball games. |
| Sand work ... | ...... | ...... | Garden and well, hill over which the sun rises, grassy plains. |
| Tablet-laying ... | The sun, the rainbow, the sun-dial, garden beds and the surface of forms from Gifts V and VI. | ...... | ...... |
| Paper-cutting (free cutting or drawing and cutting). | Garden tools, the sun, the rainbow, the burning glass, the sun-dial, photo frame. | ...... | ...... |
| Games ... | Marching games ... | (1) When the morning sun is so bright.<br>(2) Up in the morning's cheerful light.<br>(3) Sunshine marching. | ...... |
| Stories ... | (1) The swan maiden, (2) The white cloud, (3) The bright King's palace, (4) The rainbow, (5) The wind and the sun, (6) The little seed, and (7) The sun's sisters. | | |
| Recitation ... | Four verses taken from Kannada Literature. | | |

A translation of the following marching song by Heerwart was used for one of the marching games :—

(1)

Up in the morning's cheerful light !
Up ! up ! in the morning's cheerful light,
Up in the morning early !
The sun is shining warm and bright,
And the birds are singing cheerly.

(2)

Now summer dews are on the grass,
All hanging pure and pearly !
And morning moments quickly pass,
Up ! in the morning early !

## IV. The Sunflower.

" Little flower ..................if I could understand,
What you are, root and all, and all in all,
I should know what God and man is."

The study of this plant was conducted in the Practising School during the months of August and September 1908. As the sunflower plants in the garden had grown luxuriently and bore many flowers, the time was suitable for the study of this plant. The work was carried on according to the following scheme :—

I. The aim :—

The sunflower by its shape, colour, structure, and use is one of the most beautiful flowers in God's creation. Children are very glad to see the large full-blown flower of this plant. It is pleasure of this kind, that enhances love towards nature. While the sunflower is an object of special consideration, children should be made to examine other plants of this order. Such an examination increases their knowledge of plants and furnishes them with information much useful in after-life.

II. Preparation by teacher :—

The teacher should grow his own plant and should obtain first-hand information about the plant by careful observation. He should grow not only the several varieties of the sunflower plant but other plants belonging to this order. He should note down the similarities and differences between one plant and another of the species. He should read books on Botany and obtain additional information about the composite family.

III. Plan of work :—

(1) *The seed.*—Give a seed to each child and have a chat about its shape, colour, length, breadth and edges. Let children plant a few seeds in saucers and pots and water them every day.

(2) *The plant.*—Children should measure the height of the plants in the garden and compare it with their own heights. Make children see that the stem is about one inch thick, is rough and has edges, white hairs and cracks throughout its length.

(3) *Leaves and branches.*—Let children measure the length and breadth of leaves on the main stem. Ask them about the shape of the leaf. Let them name a similar leaf they have observed. Let them see whether the edge is cut up or not. Let them measure the length of the leaf stalk and compare this leaf with the zinnia leaf with respect to stalk. Let them observe how the leaves are arranged on the stalk. Have a chat with them about the use of the leaves to the plant. Children should observe where the branches spring up, how the leaves of the branches differ from those of the main stem and how the branches end.

(4) *The flower.*—To which direction had the sunflower turned during March, to which direction has it now turned? Whom does the sunflower like? Like the sunflower whom do we also like? On what kind of morning do you like to play? By such questions the teacher should elicit that the sunflower opens towards the sun. He may then say why the flower opens towards the sun.

The children should see that each head bears only a single flower. The children should observe the calyx of the flower, see how many layers there are in it, how many teeth in each layer and whether the teeth are separate or joined at the base. What is the shape of the whole flower? How many layers of petals has it? How are the leaves of the plant arranged at the base of the flower? What are the little things seen in the middle of the flower? How many petals do the small flowers contain? Are the small flowers of the same size in all varieties of sunflower? What is it that has risen from the middle of the small flowers? What kind of dust sticks to the hand when we touch these little projections? What sticks to the hand when we touch the middle of the whole flower? Who visit the flower every now and then? What is the purpose of such a visit? The teacher should draw the attention of the children to the structure of the flower by means of such questions. What remains in the middle of the big flower when the small flowers fall off? What is the difference between the formation of the sunflower seeds and the bean seeds? By means of such questions the

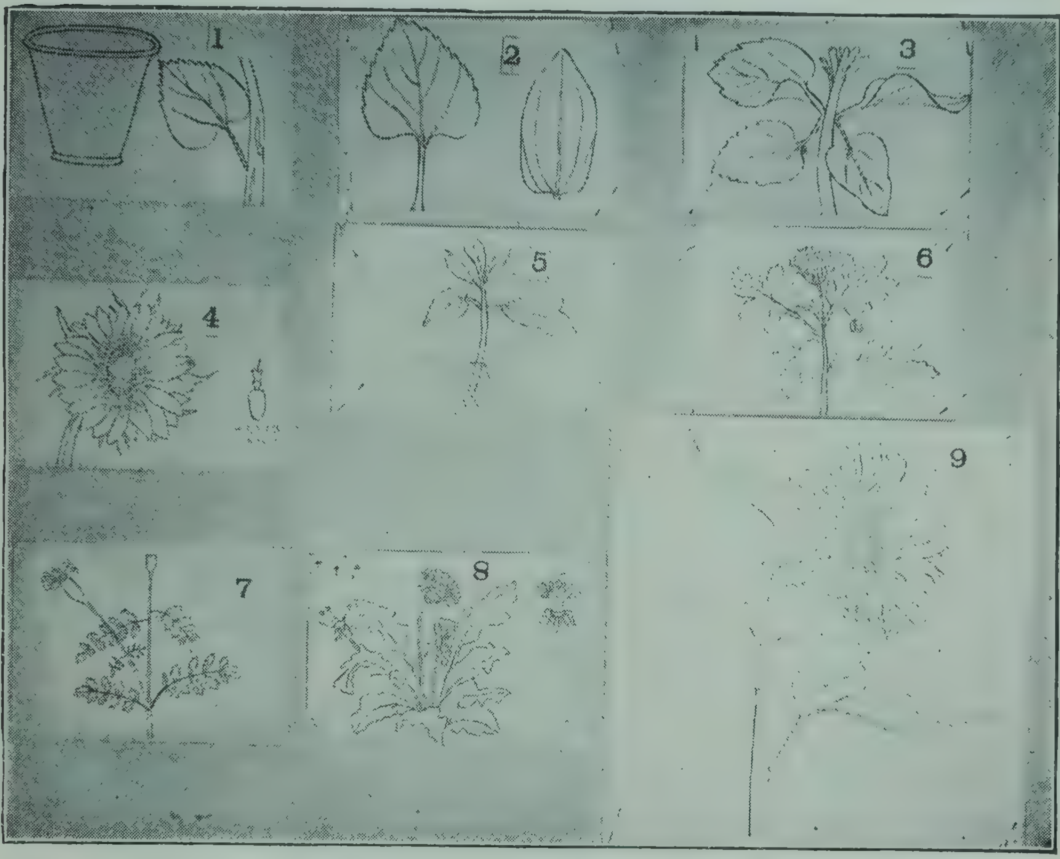

FIG. 31.—DRAWINGS IN CONNECTION WITH THE STUDY OF THE SUNFLOWER.

teacher should elicit that in the sunflower the seeds are formed not inside but below the small flowers and that there are no pods here, the seeds being naked.

IV. Observation of other plants of the order :—

While the children study the sunflower, they should examine the flowers of marigold, zinnia, dhalia, calliopsis, cosmos and other members of the composite family. They should see that in this family there is only one flower in each head. They should note the arrangement some seeds have for flying in the wind. Results of their observations should be expressed in drawing and language. They should note the time that elapses between the germination of the sunflower seed and the flowering of the plant.

V. Uses of the plant :—

The children should see that oil comes out when the sunflower seed is pressed. They may then be told the uses of this oil. The teacher may tell them that the leaf is used for medicinal purposes and that the plant when grown on marshy plains acts as a preventive for malaria.

VI. Garden work :—

Transplanting sun-flower, zinnia, chrysanthemum and cosmos seedlings from pots to beds. Giving support to grown up sunflower plants and collecting seeds from dried flowers. Removing spent-up plants. Weeding the beds and tidying the paths.

Figure 31 shows some of the drawings made by children during the study of the sunflower.

(1) Pot in which the sunflower seeds were put in and stem of sunflower showing cracks.

(2) Sunflower leaf and zinnia leaf.

(3) Stem of sunflower having four leaves at one point.

(4) The whole flower and one of the small flowers in the middle of the big flower.

(5) Young plant with five or six leaves.

(6) Chrysanthemum spray with one or two flowers.

(7) Marigold spray with one or two flowers.

(8) Dandelion plant with one or two flowers.

(9) The head of a full-grown sunflower plant with two or three leaves and a big flower.

Gifts, occupations, stories, games and recitations used in connection.

| | Class I | Infant B | Infant A |
|---|---|---|---|
| Drawing (free and other). | Sunflower leaf, pot in which the seeds were planted, stem showing cracks, sunflower, sunflower in a vase, a spray of leaves, spray of cosmos, zinnia, calliopsis, chrysanthemum, & dahlia with flowers on, basket for keeping flowers, water can. | Pot in which the sunflower seeds were put in, sunflower leaf, stem with cracks, flower bund, sunflower, leaves of cosmos, zinnia, calliopsis, dandelion and gaillardia, basket for flowers and water can. | Pot in which seeds were put in, sunflower leaf, stem showing cracks, sunflower bud, leaves of zinnia, dahlia, and dandelion, basket for flowers and water can. |
| Brush-work ... | Sunflower leaf, flower, leaves of zinnia, calliopsis, dahlia, and dandelion, a spray with leaves. | ...... | ...... |
| Clay-modelling ... | Pot, sunflower leaf, flower, leaves of dahlia, calliopsis, zinnia, dandelion, flowers of cosmos and chrysanthemum, basket. | Pot, sunflower leaf, flower, leaves of zinnia, dahlia, and dandelion, basket. | Pot, basket, stem of sunflower showing corners and cracks, sunflower. |
| Paper-folding (squares and oblongs to be used). | Flower vases, baskets of various kinds, bags for seeds, flower pot, double pocket for seeds, flower-holder. | Double flower vase, basket for flowers, seed vessel, flower-holder, flower pot. | Flower pot, table cloth, basket, seed vessel. |
| Gift III and IV... | ...... | Garden, hedge, flower stand, water pump, front of cupboard, garden house, garden, garden seat, flower beds with Gift IV. | Garden bench, chair, flower stand, garden house, well, flower beds with Gift III. |
| Gift V and VI ... | Garden with many beds, garden with house, hedge, garden well, garden with bench, chair and table in it. | ...... | ...... |
| Stick and rings ... | ...... | Flower beds, hedge, sunflower leaf, sunflower, zinnia leaf, flower vase, basket, flower pot. | As in B. |
| Thread-laying ... | ...... | ...... | Sunflower leaf, zinnia leaf, dandelion leaf, sunflower. |
| Sandwork ... | (In connection with Geography.) | Grassy plain with trees of autumn, grassy plain with wild plants of the composite family such as dandelion, etc., slope of a hill with wild plants, a tank in the vicinity, plan of school garden with sunflower beds indicated. | As in B. |

| | Class I | Infant B | Infant A |
|---|---|---|---|
| Mat-weaving ... | Mat with bamboo splits to go under the flower pot or for a window screen. | ...... | ...... |
| Paper-cutting ... | Leaves of sunflower, zinnia, and dandelion, sunflower, cosmos, calliopsis, and other flowers. | As in Class I. ... | ...... |
| Stories ... | (1) The story of the sunflower, (2) Zinnia and chrysanthemum, (3) The story of dandelion. | | |
| Recitation ... | Verses from Kannada literature on autumn. | | |
| Games ... | (1) The garden, (2) The trees, (3) The flower game by Heerwart. | | |

The following is one of the stories used in connection :—

*The story of the sunflower.*

Far in the depths of the sea, there once lived a little girl, in one of the caves of the sea-king. Her name was Clytie. The walls of her cave were decorated with pearls and mother-of-pearls. On the floor of the cave was spread beautiful white sand. In the cave there were many chairs and sofas with cushions of soft green moss. In her garden grew various kinds of beautiful sea-weeds. Golden fishes were the horses she used for her carriage. One day her servants brought her a beautiful green dress. She put on this dress, combed her golden hair, sat in her carriage of oyster shells, and went out for a drive. The warmth of the sea water and the gentle motion of the carriage put her to sleep. She was awakened by the carriage striking against a rock of an island in the middle of the sea. This was the first time that Clytie came on land. She climbed up the rock to see where she was and what sort of a land she had landed upon. A few children who were standing on the shore cried out 'He is coming ! He is coming !' She looked up towards the east which was the direction they were pointing. What do you think she saw ? The brightest king of the world was coming out of his palace seated on his golden chariot. As soon as he came out, the birds began to sing, the flowers began to open, and the sea, filled with gladness, began to rise higher and higher. The whole of that day Clytie spent in gazing at the king, she too wished to be like him. When the king entered his western dominions she went home, spent the night with great difficulty and came back to the rock before the king came out of his palace in the east. She did so for many days and the desire to be like the king grew in her mind day by day. One day when she thought of going home, she was unable to move. She was astonished at this and looked at her image in the water. What do you think she saw ? It was not her face that she saw but a beautiful golden flower in the place where her face was. Her golden hair had changed into golden petals. Her green dress had changed into green leaves and stems and her little feet had changed into roots. Thus in the place where the little girl stood there grew a beautiful sunflower plant.

Next day the king sent her to all the countries of the world to gladden the hearts of his subjects by the look of her bright golden face.

## V. THE STUDY OF PIGEONS.

" One silent eve, I wander'd late
And heard the voice of love,
The turtle thus addressed her mate
And soothed the listening dove :

' Our mutual bond of faith and truth
No time shall disengage,
Those blessings of our early youth
Shall cheer our latest age.' "

—*Cowper.*

" Happy as a robin,
Gentle as a dove,
That's the sort of little child
Every one will love."

The study of pigeons was conducted in the Practising School during the months of November and December 1908 and January 1909. The following scheme shows the manner in which the study was conducted.

I. Aim :—

The two great classes of living things in the world are plants and animals. The aim of this lesson is to make the children acquainted with the habits and structure of an important class of animals, namely, birds flying in the air. To engage children in the care of animals, to make them love animals of a lower order, to point out to them the wonderful things that can be observed in the various stages of the development of animal life, and above all to implant in them love and reverence to God, the creator of all these wonderful beings—these are the aims that should influence us in choosing a subject of this kind for special consideration. The gentleness, constancy, and good faith of the dove must exercise a wholesome influence on the character of the children.

II. Preparation by teacher :—

Every day the teacher should observe the pigeons kept at school and make a note of the important results of his observation.

He should read books on Zoology and collect full information about the various kinds of pigeons and the habits peculiar to each kind. Some months before the special consideration of pigeons, the children should keep a few birds at school, take care of them every day and observe their habits while engaged in their loving labour.

III. Plan of work :—

(1) *The egg.*—The bird lays two eggs at a time. These are almond-shaped and of a pinkish white colour. Some are longer than others. The white colour gradually diminishes and the pink colour becomes more and more predominant. There is also a slight dimunition in weight. Children should note the day on which they are hatched and thus measure the time between the laying and the hatching of eggs. This period should be about seventeen days. As the time of hatching approaches, children should note that the mother bird constantly sits upon the eggs without leaving her place even for food or water. Children should find out the cause of such constant sitting. Have a chat with children about the care their mother took to bring them up. Let children see that during this period the male bird often takes the place of the mother bird and sends her out for food. Have a talk with them about the love that exists between the mother bird and her mate. When the egg is ready to be hatched, children should see how the mother bird pecks at it with its beak and makes a way for the young one to come out. Children should note how carefully the mother bird collects the pieces of the egg-shell, takes them out and throws them far from her home. This is an opportunity for a lesson on cleanliness. Let children feel that the shell is hard. Tell them that it is made of limestone and show that it can be converted into quicklime by heating it with charcoal.

(2) *The young ones.*—The young ones just hatched are of the size of a lime fruit and are of a yellowish dark colour. They can neither walk nor fly. Why can they not walk or fly? Let children observe how the mother brings food in her throat, how the young one puts its tiny beak into her throat and takes her food from there. Have a conversation with children as to who lovingly gives them bread, butter and milk at home. The young ones grow rapidly and change colour day by day. Some turn gray, others turn pure white, and others become spotted. Let children observe the wonderful transformation of colour in the neck of the bird. What does the mother do when we attempt to touch the young ones? Why does it do so? By such questions elicit the care of the mother bird for her young ones. Let children notice the

difference between the sound made by the young bird and the cooing of the old bird. Children should also notice how much time the bird takes to be able to get its own food, to walk and to fly after it is hatched. Let children compare this period with the time they took to be able to walk without help and to get their own food.

(3) *The grown-up bird*:—

(*a*) *The head.*—The most prominent part of the head is the beak. This is hard, pointed, and slightly curved. Round the eye there is a layer of bare skin without any hairs. Some birds have a cock on the top of the head.

(*b*) *The neck.*—The neck is long and multicoloured when the bird coos, the hairs stand erect and the neck becomes distended.

(*c*) *The chest and other parts.*—The chest bone is strong and broad. All the important muscles of the body are attached to it. This helps the bird to fly. The shoulder blades are connected with the bones of the fore legs. There is a single bone in the upper part of the fore leg, two in the lower part, and there is a long bone in the place of the ankle and toes; in all, there are four bones in the upper limb. All the important feathers useful for flying are attached to the fore limbs. As these feathers cover up the fore limbs, the bird seems to have no fore legs at all. In the lower limb there are four toes, three in front and one at the back. The toes are curved inwards. This enables the bird to hold branches of trees firmly. The children should carefully observe this difference between the upper and the lower limbs. Let children open the mouth of the bird and see that it has no teeth. They should also observe its rough long and sticky tongue. Let them observe the little bag at the neck of the bird and ask them about its use.

(*d*) *Habits.*—It is the male bird that coos mostly; sometimes it makes a clucking sound. When two male birds fight, they bend their heads and stiffen their necks. What do these birds pick up near the walls? These little stones do them the work that our teeth do for us. They also pick up quicklime near the walls. Can you tell me why? They are fond of bathing. Shall we not try to be neat and clean like these beautiful creatures? The male and the female birds sit together and pick up parasites from each other. Just like you these birds like to play in the sun. These are very fond of children who take care of them. See! One has perched itself on your shoulder; there is another on his arm. You may take them away far from their nest but when let go, they will come back to it. By careful observation and by pleasant chat every now and then, make the children familiar with the habits of the bird.

(*e*) *Food.*—Let children tell the names of the seeds with which they feed the birds every day. Let them find out which seeds the pigeons like most.

IV. Various kinds of pigeons:—

Have a chat with the children about the different colours of the pigeons they rear at school. Let them see that some are white, some gray and some spotted. Show them a flight of wild pigeons and let them see that gray is the most common colour among pigeons. Children should carefully observe the fantail pigeons they rear at school. They should note how the feathers of these birds are raised up and spread out like a fan and how beautifully they bend back their necks. They should watch the playful somersaults of these wonderful creatures. Though the fantail pigeons have more feathers than the ordinary pigeons, they cannot fly as fast, as the feathers are not attached to the fore legs. Impress upon

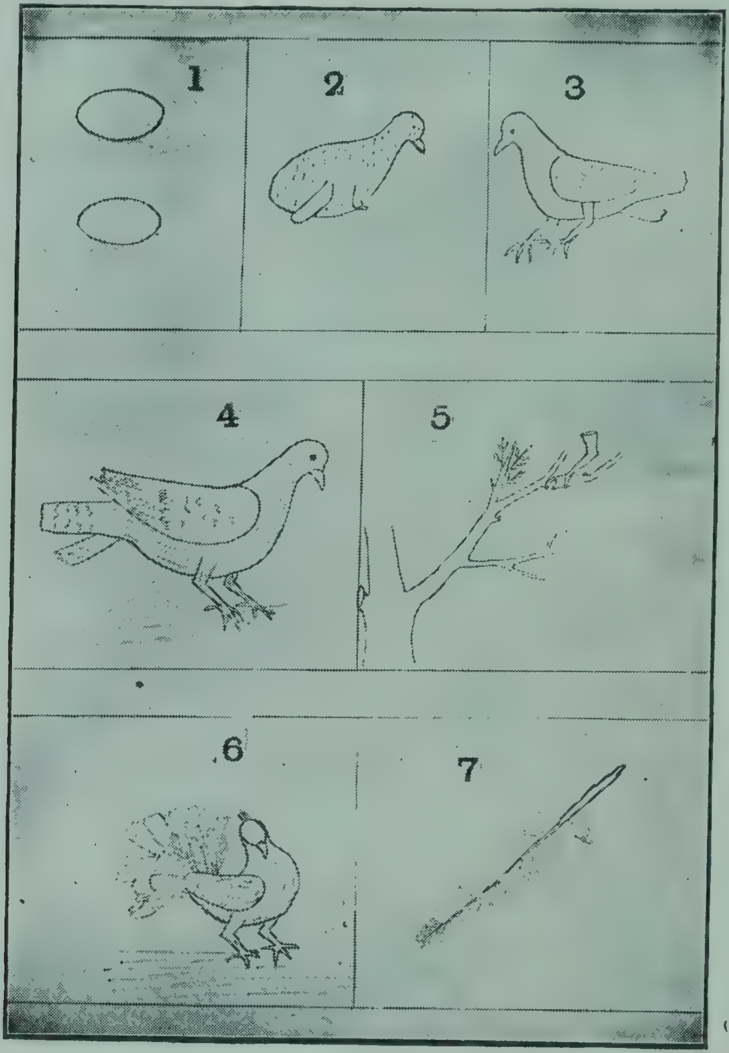

FIG. 32.—DRAWING IN CONNECTION WITH THE STUDY OF THE PIGEON.

the children that we should love these wonderful creatures and should never injure them. Draw the attention of the children from these wonderful creatures to their Maker who has created countless creatures of this kind in the world.

V. Use of pigeons :—

A few children should take one of their flying pigeons far from the school, tie to its leg a bit of paper containing a message to their friends and send it back to school.

Figure 32 shows some of the drawings made by children during the study of the pigeons.

(1) The eggs.
(2) The young one.
(3) The young one able to move.
(4) The grown-up bird.
(5) The hind leg.
(6) A fantail pigeon with a little cock on the head.
(7) A feather.

Gifts, occupations, stories, games and recitations used in connection.

| | Class I | Infant B | Infant A |
|---|---|---|---|
| Drawing (free and other). | Egg, pigeon house, vessel from which the birds drink water, vessel from which they feed, young bird, grown-up bird, a feather, fantail pigeon, the hind leg. | Egg, pigeon house, vessel from which birds drink water, vessel from which they feed, young bird, a feather, grown-up bird, the hind leg. | Egg, pigeon house, vessel for drinking water, seed vessel, young bird, a feather, the hind leg, a bundle of straw for the pigeon house. |
| Brush-work ... | Egg, water vessel, pigeon house, feather, pigeon. | ...... | ...... |
| Clay-modelling ... | Egg, water vessel, young one, saucer in which seeds are kept, the grown-up bird. | Egg, water vessel, saucer in which the seeds are kept, young one. | Egg, water vessel, seeds which pigeons feed on, saucer. |
| Paper-folding ... | Seed vessels, vessels for drinking water, water can, seed bag, pigeon house, pigeon. | Seed vessels, vessels for drinking water, water can, seed bag, pigeon house. | Seed vessels, vessels for drinking water, water can. |
| Paper-cutting ... | Egg, bird, pigeon house, water vessel, bird on a tree, ladder for a pigeon house, the house on which pigeons sit, flying bird. | Egg, bird, pigeon house, water vessel, ladder for a pigeon house, the house on which pigeons sit. | ...... |
| Thread-laying ... | ...... | ...... | Water vessel, pigeon house, egg, ladder. |
| Gifts V and VI .. | House, pigeon house, post, ladder, water vessel, tank, well. | ...... | .. ... |
| Gifts III and IV | ...... | House, pigeon house, water vessel, post for a pigeon house, ladder for a pigeon house, water tank, well with Gift IV. | As in B with Gift III. |

| | Class I | Infant B | Infant A |
|---|---|---|---|
| Sticks and rings... | ...... | Egg, pigeon house, vessels for water and for seeds, post, ladder, well. | |
| Slats ... | Pigeon house, ladder | ...... | ...... |
| Sandwork ... | ...... | ...... | Sand tray showing the aspect of nature in winter, pigeon house, egg. |
| Beads ... | ...... | ...... | Front of pigeon house, pigeon on wire. |
| Stories ... | (1) The pigeon, the kite and King Sibi, (2) Pigeons saving Rome, (3) Fantail pigeon, (4) The ant and the pigeon, (5) Forethought of pigeons, (6) The pigeon, the kite, and the hunter, (7) Jane and pigeon and (8) The story of Chitragriva. | | |
| Games ... | (1) The pigeon house, (2) Birds among the green wood, (3) Little bird, you are welcome. | | |
| Recitation ... | Verses about Sibi and the pigeon. | | |

The following is one of the stories in connection :—

### *The fantail pigeon.*

A little fantail pigeon in a farmyard thought one day in the following manner—" How is it I am not so wise as other birds ? I do not seem to be useful to my mistress in any way. The hen lays eggs for her, the cow gives her milk and butter, the cuckoo sings for her, the cat catches the rats that give her much trouble, the dog watches the house, but I do nothing for her. Well, I shall consult the old owl on the tree at the back of the yard as to how I can be useful to my mistress." She went to the owl and waited upon him till the evening. The little bird had no food the whole day. She asked him—" Pray, owl, can you kindly tell me how I can be wise ? " The owl only blinked at her and spoke not a word. The evening came ; the owl opened his large wings and flew away. Home the little bird went feeling sadder than ever.

Next morning when the mistress came to the yard, instead of flying to her as usual, she hid in a corner and hung down her head. The mistress went away sad and anxious thinking that one of her most beautiful birds was ill.

An old drake who lived in the yard had a kind heart and watched over all the animals in the farmyard. He saw that the little pigeon was unhappy and made up his mind to remove the cause of her unhapiness, if it lay in his power to do so. He sent for her and asked her what the matter was with her. She said— " I am of no use in the world. All the birds and animals in the farmyard do something to my mistress, but I am of no use to her." " Foolish bird," said the old drake, " How do you know that you are of no use in the world ? Every thing that is made, is of some use in the world. Have you thought of your pretty tail and nice pink feet and of the pleasure your mistress feels when looking at them ? "

" O, I forgot all about my tail," said the little pigeon.

'Just so,' said the wise drake, " It is the way of the world. People forget the advantages they have and crave for those they cannot have. Go home and don't look miserable. Welcome your mistress when she comes to the yard to-morrow morning."

The pigeon thanked the old drake for his advice and acted up to it. Next morning when the mistress came to the yard, she was glad to see that her pretty little pigeon welcomed her as usual.

For the games that were played in connection with this study a translation of the following songs were used :—

### (1) PIGEON-HOUSE.

Our pigeon-house we open so
And let all the pigeons fly to and fro.
They fly away where e'r they please
To sunny fields and shady trees.
But when they return to their home once more,
We hasten to close the pigeon-house-door ;
And now they all meet,
Their cooing so sweet,
Tells where they have been
And all they have seen ;
Roo-coo, roo-coo, roo-coo, roo-coo,
Roo-coo, roo-coo, roo-coo, roo-coo.

—*Berry.*

### (2) BIRDS AMONG THE GREENWOOD.

(i)

Birds among the greenwood ;
Sing so full and clear ;
Warbling in the greenwood,
'Tis their joy we hear,
La, la, la, la, la, la, la, la, la, la, la,
La, la, la, la, la, la,

(ii)

Birds among the greenwood,
Build their little nest,
Leave it in the greenwood,
Ready for their rest.
La, la, la, la, la, la, etc.

(iii)

Birds among the greenwood,
Sing themselves to sleep,
Slumber in the greenwood,
Must be sweet and deep,
La, la, la, la, la, la, etc.

—*Berry.*

### (3) LITTLE BIRD, YOU ARE WELCOME.

(i)

Little bird you are welcome,
What news do you bring,
From our mother and home?
Now tell us and sing.

(ii)

One child sings.

" A kiss and a letter,
I bring you to play.
If you have something better,
I'll take it away."

(iii)

Take our mother one word
And that is our love ;
Fly away little bird,
Fly away, gentle dove.

—*Heerwart.*

## VI. THE GRASS FAMILY.

" The green grass is bowing
The morning wind is in it ;
'Tis a tune worth thy knowing,
Though it change every minute."

—*Emerson.*

" Summer passed, and Shawondasee
Breathed his sighs o'er all the landscape,
From the South-land sent his ardours,
Wafted kisses warm and tender ;
And the maize-field grew and ripened
Till it stood in all the splendour
Of its garments green and yellow,
Of its tassels and its plumage,
And the maize ears full and shining
Gleamed from bursting sheaths of verdure."

—*Longfellow.*

I. The aim :—

The grass family is of primary importance to the human race and to a large number of beasts and birds. From the humblest blade of grass growing unnoticed in the ground to the tallest and most graceful bamboo, every member of it is useful to man, beasts or birds in some way or other. The grain yielded by some members of this family is essential for animal life, and the grass is useful for fodder or for making paper. The bamboo is useful for building our houses or for making baskets, etc., that we use in our houses. Hence the study of this family is very useful from the utilitarian stand-point. The study of this family will also bring home to the children the beauty and majesty of creation. From creation they can easily be led to the Creator whose providence is seen wherever we cast our eyes.

II. Preparation by teacher :—

The teacher should grow a few plants of the grass family, observe them daily and record the results of his observations. He should make careful observations of such plants of this family as grow everywhere around him. From a book on Botany he should obtain additional information about plants of this family.

III. Plan of work :—

It is necessary to take a particular plant which is the type of this family and make careful observation of its growth, etc. The children should also grow a few other important members of this order and compare them with the plant taken for special consideration. We shall make the wheat plant the subject of our special consideration.

(1) *The seed and the young plant.*—The wheat is a long brown seed with three edges and a groove in one of the faces. There is a white spot on the side opposite to the groove. Let children put a few wheat seeds on a wet flannel after removing the white spot from some of the seeds. Let them note the gradual swelling of the seeds by absorbing moisture. From the seeds from which the oval patches have not been removed, little shoots will sprout up in a few days. Children should observe that it is from the oval patch that the shoots sprout up and that no shoots come up from those seeds from which the oval patch has been removed. One of these shoots will develop into a little green leaf growing upwards, while others remain white and root-like and grow downwards. Let children examine one of the seeds from which the oval patch has not been removed and see that there are three parts in it, namely (1) the bud which gives rise to stem and leaves, (2) the rootlet which gives rise to the roots, and (3) the white granular substance which gives food for the young plant. Children should plant a wheat seed in a wooden box with a glass side and observe

the growth of the root from day to day. At intervals they should also count the number of roots. By the side of the wheat plant they should plant a rice and a maize seed and compare the growth of these plants with that of the wheat plant. Let them see that from each of these plants only a single leaf rises up and compare this fact with what they observed in the case of the bean.

(2) *The leaves of the grass family.*—The leaves of this family are long with longitudinal lines. They grow throughout the length of the stem and are arranged alternately upon it. They rise up from knots and clasp the stem for some distance. Children should observe the wonderful arrangement that exists for preventing water from percolating between the stem and the sheath. The teacher may ask them about the injury to the plant by such percolation. Children should observe that the edges of many grass leaves cut the fingers if passed between. If a few blades of these harder kinds of grass are taken and burnt, they leave white ash behind them. The teacher may say that the white ash contains flint which is the cause of the hardness above noticed. The harder leaves such as those of the wheat or the bamboo contain more of this flint. The hard stem of the bamboo contains a large quantity of flint which causes fire when the stems rub against each other. Children should examine what other stems are hard like those of the bamboo or the wheat. Children should observe that many grass leaves are flat in the morning and close up by noon. The teacher should explain that when there is much water on them they are flat so as to hasten evaporation, but when there is no water they close up so as to prevent evaporation.

(3) *The stem.*—The stem of the grass family is generally long and slender and there are knots all along it. In many plants it is hollow except at the joints. But in some plants, such as the maize, it is filled with spongy matter. Even in those plants in which the stem is hollow, it is not so when the plant is young. But at the flowering time it grows very rapidly. Can the children tell why? The children should see that the plant tries to raise the flowers above the surrounding plants. In this attempt it grows so fast that the stem becomes hollow. The children should also note that in the grasses which spread on the ground, the stem is generally solid. How do the roots grow in the wheat plant? They grow in tufts from the base of the stem. Can they tell the names of some other plants of this family which have similar roots? Let children pull up the long stem of a grass spreading on the ground. They will find that there are roots at each joint. In the maize plant, the children should note that roots grow not only from the

base of the stem, but from the joint above the base. In the wheat and other long grasses, the children should note the closeness of the joints at the base and that they get more and more slender towards the end, the terminal joints being especially long and slender. They should see that by this arrangement the stem bends gracefully before the wind but does not break. Of what use are the joints to the stem? They give strength to the stem and raise it up when it is prostrated by the wind. Let children note how the joints absorb water and raise up the stem.

(4) *The root.*—Let children see that in the wheat and other grasses many long, slender, roots grow from the base of the stem or from the joints. Let them compare these roots with those of the bean or the sun-flower. Let children find out the use of the double row of roots in the maize plant.

(5) *The flowers and fruits.*—In the wheat stalk, there are four rows of flowers at the end. Hence the ear appears to be four-cornered. Examine a small portion of this ear. First there are two hard outer coats. Inside them there are two or three small flowers. In each flower there are two large calyx leaves, two small flower leaves or petals, three stamens, one ovary and two stigmas. The children should carefully note these parts and compare them with the parts of the rice and other grass flowers. They should also note that in the maize plant the male flowers are at the top and female flowers at the side of the stem. As in the bean the seeds are covered up warmly and are not exposed to cold as in the sun-flower. The children should see that the flowers of the wheat and other grasses have no attractive colour and have not many visitors. They should observe the help given by the wind by shaking the dust from the flowers. Let children see that the maize is the largest of the grass seeds. Draw their attention to the long wonderful silky hairs in its ear.

IV. Rambles:—

When wheat is the object of special consideration, the children should undertake rambles in the plains around the school, collect various specimens of grass, press the juice out of them, preserve them in their note books and write the name of each kind under the specimen.

V. The use of the grass family:—

(1) The seed of many grasses is the main article of food for men and animals.

(2) The leaf of many varieties is used as fodder for some animals.

(3) The stem of the bamboo is used for building our houses.

(4) From the stem of some varieties we get the sugar we so much like.

Should we not thank God who has given us all these comforts through these plants?

Gifts, occupations stories, games and songs used in this connection.

| | Class I | Infant B | Infant A |
|---|---|---|---|
| Drawing (free and other). | Wheat seed, young plant, roots as seen through the glass plate of the box, the stem showing arrangement of leaves, the ear of wheat, the maize plant showing the two kinds of flowers, the ears of rice, and a few other grasses. | Wheat seed, young plant with single leaf, plant two weeks old, the roots as seen through glass plate, a stem with a few leaves, the ears of wheat and rice. | Wheat seed, plant with single leaf, plant two weeks old, the roots as seen through glass plates, the stem with two or three leaves, the ears of wheat and rice. |
| Brush-work ... | Wheat seed, the young plant with a single blade, the young plant with a few blades, the stem showing arrangement of leaves, the ear of wheat. | ...... | ...... |
| Clay-modelling (plasticine may be used with advantage). | Wheat seed, maize seed, young plant, part of stem showing a few blades, the ear of wheat with a few blades. | Wheat seed, maize seed, young plant, part of stem showing two or three blades, the ear of wheat. | Wheat seed, maize seed, young plant, the ear of wheat. |
| Paper-folding .. | Seed—vessels, wind-mill for flour making, table cloth, table, chair, tray for removing husks, seed bags, caps plaited with straw. | Seed vessels, seed bags, wind-mill for flour making, table cloth, table, chair, tray for removing husks, straw caps. | Seed vessels, seed bags, table cloth, table, chair, tray for removing husks. |
| Paper-cutting ... | Blade of wheat, paper-stem with blades pasted. | Ears of wheat, rice, ragi and maize. | ...... |
| Gifts III and IV | ...... | Garden, well, basket, table, table and seats, shop, cupboard, fire-place, plan of vegetable garden (with gift IV). | Garden, well, basket, table and seats, long seats, shop, cupboard, fire-place (with gift III). |
| Gifts V and VI .. | Garden wall, garden with beds, seats and garden house, garden fence, park with gates, park seats, field. | ...... | ...... |
| Sticks and rings | ...... | Wheat seed, ear of wheat, plan of garden, basket, bowl, sickle, garden tools, watering can. | ...... |
| Bead-threading ... | ...... | ...... | Beads threaded on sticks for fence or border, etc., of sand gardens. |
| Thread-laying ... | ...... | Sickle, blade of wheat, garden tools, garden bed. | ...... |

| | Class I | Infant B | Infant A |
|---|---|---|---|
| Sand-work ... | ...... | Kitchen gardens, grassy plains, flower gardens. | A corn field. |
| Stories ... | (1) The little seed, (2) Spring and her helpers, (3) The corn mowers, (4) The farmer and the birds. | | |
| Games ... | (1) Through the meadows I go, (2) All the meadows are green (Berry), (3) Threshing (In golden sheaves the wheat is reaped) (Berry). | | |
| Recitation ... | Description of corn fields from Kannada Literature. | | |
| Pictures ... | Fitzroy's pictures. Summer, the corn mowers, etc. | | |

The following is one of the stories used in this connection :—

### *The Farmer and the Birds.*

Mr. and Mrs. Sparrow thought themselves very fortunate when they found themselves in a large rice field. The corn had just been planted and the little shoots were coming up one by one.

Mr. Sparrow said :—" What a large nice field this is ! There are plenty of little caterpillars for us. By and by, the corn will grow and we shall then have plenty to eat. Shall we make our nest in this little bush here?" Mrs. Sparrow :—" The farmer may remove this bush and drive us away. His little boy may do harm to my eggs when I lay them."

Mr. Sparrow :—" The farmer is a kind-hearted gentleman. He likes our chirruping. The little boy is as kind as the father. He will not harm our eggs like many other cruel boys. If you like, we shall make our nest here."

Mrs. Sparrow gave her consent to the proposal and they made their tiny nest in that bush. In a few days she laid three little eggs in the nest. Meanwhile the corn grew and the whole field looked green and cheerful. The farmer, his little son and many servants came to the field to remove the weeds that had grown up with the corn. While they were at work the little boy cried :— " See, father, there are two little sparrows in that bush, chirruping and cheering us in our work." Father :—" They act as if they had a nest there. Let us go near and see." When they went near, they not only saw that there was a nest there but that there were three little eggs in it. The nest was constructed in such a beautiful manner as to completely protect the eggs from heat and cold. The farmer told the servants not to disturb the birds but to leave them in the peaceful enjoyment of their home. In a few days the eggs were hatched and three tiny sparrows were added to the family. Meanwhile the rice grew in the field. The rain came and helped them to grow. From light green they changed to dark green. Every day the sparrows went to the field and ate up the worms and the caterpillars which were destroying the farmer's plants. The autumn came and the corn put on their golden dress. The ears bent down their heads and by a graceful motion of their heads beckoned the sparrows to come and have a feast. The sparrows were only too glad to respond to this kind invitation. Do you think the farmer grudged them the few grains they took from his field? Certainly not, he was not so selfish as to behave in such a cruel way. When the crop was ripe and the farmer was gathering it, the sparrows chirruped as if to thank him for all his kindness.

A translation of the following song was used in one of the games that were played in this connection :—

*Threshing.*

In golden sheaves the wheat is reap'd
And in the farm 'tis safely heap'd,
For grain the miller's praying,
For flour the father's paying,
That mother may be making
Fresh loaves and cakes for baking.
Off to the barn with speedy feet,
With swinging flail to thrash the wheat
Tick, tack, tick, tack, tick, tack, tack,
Tick, tack, tick, tack, tick, tack, tack.

—*Berry.*

## VII. The Cotton Family.

Dear spot (garden)! which we
Have watched with tender heed,
Bringing thee chosen plants and blossoms blown,
Among the distant mountains, flower and weed,
Which thou hast taken to thee as thy own,
Making all kindness registered and known ;
Thou for our sakes, though Nature's child indeed,
Fair in thyself and beautiful alone,
Hast taken gifts which thou dost little need.

—*Wordsworth.*

I. The aim :—

Next to food, the most important want of man is clothing. Cotton supplies this need more than any other material. The beautiful varieties of form and colour in the flowers of some plants of this family such as the cotton, the holly-hock, and the shoe-flower, and the wonderful transformation of colour in the cotton flower contribute not a little towards creating a deep love and reverence for nature in the minds of the children. From reverence to nature it is but another step to reverence for Him who is behind nature.

II. Preparation by teacher:—

Some months before the study of this family is taken up in the classes, the teacher should plant the seeds of the cotton, the holly-hock and the lady's finger, and the cuttings of the shoe-flower and record the results of his observations. From books on Botany, he should get detailed information about the Malvacæ order of plants.

III. Plan of work:—

Though the shoe-flower is the type of this family, the teacher should take up the cotton plant for special consideration, as it has more points of contact with the daily life of children than the shoe-flower.

(1) *The seed and the young plant.*—The seeds of the field cotton are green and of the shape of lime seeds. The seeds of the tree cotton are dark and are plaited with one another. The inside pulp contains a sweet scented oil which can be pressed out with the fingers. The base of the stem is reddish in the young plant and the first two leaves resemble our ears in shape. The next leaves have three, four or five points like our fingers.

(2) *The grown-up plant.*—The stem when tender is green but gradually turns dark red. Children should carefully notice the difference in size between the leaf of the tree cotton and the field cotton. Let children see that in the same plant there are leaves with three, four or five points. Draw the attention of the children to the leaflets at the point where the leaf stalk rises from the stem. Children should observe the broad-pointed leaf of the cotton and the serrated leaf of the shoe-flower. Let children compare the cotton leaf with the leaf of the holly-hock or the lady's finger. They should also observe the rough points on the stem of the cotton.

(3) *The flower.*—On the stems, we see something besides the leaves. These are the green flower buds. In some of the buds something yellow is peeping out from between the points of the covering. In the full-blown flower, the green covering has changed into a cup. Let children count the points of the cup and observe the shape of the flower-leaf and its pale yellow colour. Let children count the number of flower leaves in the cotton, the shoe-flower, the holly-hock and the lady's finger. Let children feel that there is something hard at the base of the flower cup. Draw their attention to the long thick column at the middle of the flower. At the upper part of this column, let children see that there are threads with yellow knobs. Let them touch these knobs and see

what sticks to the hand. Let children see that the column ends in red sticky knobs. Children should observe that the cotton flower when fresh is pale yellow in colour but turns red by evening. Let them say what other flowers change their colour in this manner. Let them see that one kind of cotton in their garden has red instead of yellow flowers. Draw the attention of the children to the different kinds of shoe-flowers in the garden. Some are red, some white and some of salmon colour. Let them observe the arrangement of leaves, etc., in the double shoe-flower. Let them see that in the holly-hock, there is also variety of colour though the form remains the same. In the flower of the lady's finger, there is a beautiful red cup at the bottom of the flower. Ask them who made these wonderful flowers of such beautiful colours.

(4) *The fruit.*—Children should see what remains behind when the flower leaves have fallen off. Let them observe the shape, size, and colour of the hard knob. Draw the attention of the children to the conical shape of the developed pod; let them count the edges on the pod. Some pods have dried up and split open. What is the white thing that we see? Into how many parts has the pod split open? To what are the cotton threads attached? How are the seeds arranged in the pod? Can they name other hairy seeds? Let children separate the hairy cotton from the seeds and draw it into threads. Let them compare the cotton fruit with the fruit of the lady's finger.

IV. Uses of cotton:—

(1) Show children different-coloured cotton yarn and cloth and have a chat with them about the immense value of cotton to man. Show them the picture of a cotton field and let them realise that many people toil for their sake. Show them the picture of a cotton factory and have a conversation lesson on the stages in the manufacture of cotton.

(2) Show them that oil can be pressed out of the seeds. Tell them the uses of this oil. Tell them that the cake that remains after the oil is pressed is used as a valuable manure.

(3) Let children see that the cotton seeds are used in our country as food for cows.

V. Garden work:—

During the study of this family the children should plant in the garden the different varieties of the cotton, the shoe-flower and the holly-hock. They should also plant the lady's finger (okra) and other members of the Malvacæ family. When the pods split open they should gather the cotton from it and remove the spent-up pods from the plant. They may have a small feast from the pods of the lady's finger (okra).

Gifts, occupations, games and stories used in this connection.

| | Class I | Infant B | Infant A |
|---|---|---|---|
| Drawing (free and other) | The young plant with the first two leaves, the plant with four leaves, a single leaf of a grown-up plant, a spray with leaves, stem with flower bud, a flower, the shoe-flower, the okra flower, the holly-hock flower, the pod, the pod split up, flower vase, flower pot, garden tools. | The young plant with the two first leaves, the plant with four leaves, a single leaf, stem with flower bud, a flower, the shoe-flower, the flower of the okra and the holly-hock, the pod, the pod split up, flower vase, flower pot, garden tools. | The young plant with two leaves, with four leaves, a single leaf, stem with flower bud, the pod, the pod split up, flower vase, flower pot, garden tools. |
| Clay modelling | Flower pot, the leaves of cotton, shoe-flower and holly-hock, the flower bud, the flower, the pod, the pod split up, a vase. | Flower pot, the leaves of cotton, shoe-flower, holly-hock, the flower bud, the pod, the pod split up, a vase. | Flower pot, cotton leaf, the flower bud, the pod, the pod split up, a vase. |
| Brush-work ... | Leaves of cotton, shoe-flower and holly-hock, spray of leaves, the bud with the flower peeping out, the full-blown flower. | ...... | ...... |
| Paper folding ... | A vase, a flower pot, seed, cupboard, a basket, seed boxes, the table on which the flowers are kept, table cloth, a tent, a coat, a pair of trousers. | A vase, a flower pot, seed boxes, cupboard, a basket, a table with cloth, a tent. | A vase, a flower pot, seed boxes, cupboard, a basket, a table cloth, a tent. |
| Gifts III and IV | ...... | Compound wall, wells, garden house, garden, flower stand, seeds, gate (with gift IV). | Compound wall, wells, garden house, garden fence, flower stand, seeds, gate, shop (with gift III). |
| Gifts V and VI ... | Garden with beds, wells, garden with house, paths and beds, garden fence and gate, factory, cow shed. | ...... | ...... |
| Stick and ring laying. | ...... | A vase, a flower pot, water can, a flat cupboard, garden tools, the cotton leaf, the pod. | ...... |
| Sand-work ... | ...... | The cotton field (with little branches from the garden and cotton gatherers cut from cardboard by older children), the garden with cotton beds indicated, a garden path. | ...... |
| Paper-cutting ... | The flower, the pod, the leaves of cotton, holly-hock and shoe-flower, the pod split up. | ...... | ...... |
| Gift I ... | ...... | ...... | Colour game with balls of different-coloured yarn, game of drawing water. |

| | Class I | Infant B | Infant A |
|---|---|---|---|
| Fraying ... | ...... | ...... | A screen, a tent, a broom, a brush from pieces of coloured cotton stuff. |
| Stories ... | (1) Machinery magic, (2) The cotton field. | | |
| Games ... | (1) The mill, (2) Work. | | |
| Pictures ... | (1) Cotton gatherers, (2) A factory, (3) A mill pressing oil from seeds. | | |

The following is a story used in this connection:—

*The Cotton Field.*

On a bright sunny morning, a large cotton field looked beautifully white from the large number of pods that had burst open. The cotton gatherers who were busy all the morning went away at noon to get their dinner. The field was left entirely to the plants and they began to talk among themselves in the following manner.

One plant said:—"I should be very glad to know what becomes of the cotton we give when it goes out into the wide world." A young plant looked very important and said:—"Oh, I know all about it. Why, it goes to the cotton gin out there in that building." Other plants:—"Oh! we know that as well as you, but we should like to know what becomes of the cotton after that." "I can tell you something about it," came a voice from the middle of the field. All the plants turned in the direction whence the voice came. What do you think they saw there? A little bird unable to fly, having broken its wings. The bird said:—"Every year about this time I used to go to the pleasant northern land with my mate. While out there, one day, we were searching for material with which to build our nest. The family for whom we were singing every day, threw something useful for our purpose. What do you think it was? It was a bunch of long fine cotton threads. The threads were so fine and strong that we were very glad to use them for our nest. I am very sorry I am unable to go there this year." The gentle breeze and the sun-beams that were listening all the while now joined in the conversation. They said:—"We know something more about the cotton that goes out from here. Very often we have dried cotton cloth—long and broad and as white as the snow on the hills in those parts." The plants were glad to hear these delightful stories about themselves.

Soon after, the workmen came to the field and with them came the master of the field with his two little children. The cotton plants were, of course, silent after that. The farmer and his children continued the story begun by the little bird, the sunbeams and the breeze. They spoke of cotton quilts used for beds, cotton lint used by doctors, cotton wicks for lamps, and so on. The plants were very glad to hear that they were so useful in the world.

A translation of the following song was used in one of the games :—

### WORK.

(i)

Up, workman, up, away to work,
The fact'ry bell gives warning,
Alert and strong he steps along,
Rejoicing in the morning,
La, la, la, la, la, la, la, la, la, la, la, la,
La, la, la,

(ii)

How well he hammers, saws and planes
And neatly draws to measure,
With all he does, he takes such pains,
To watch him is a pleasure.

The girls can plait and iron here,
And deftly use a thimble ;
To work in time while singing clear,
Will make your fingers nimble.

—*Berry.*

THE END.

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